

Liebert® DCR—Part of the SmartRow™ Offering

Installation Manual—60Hz

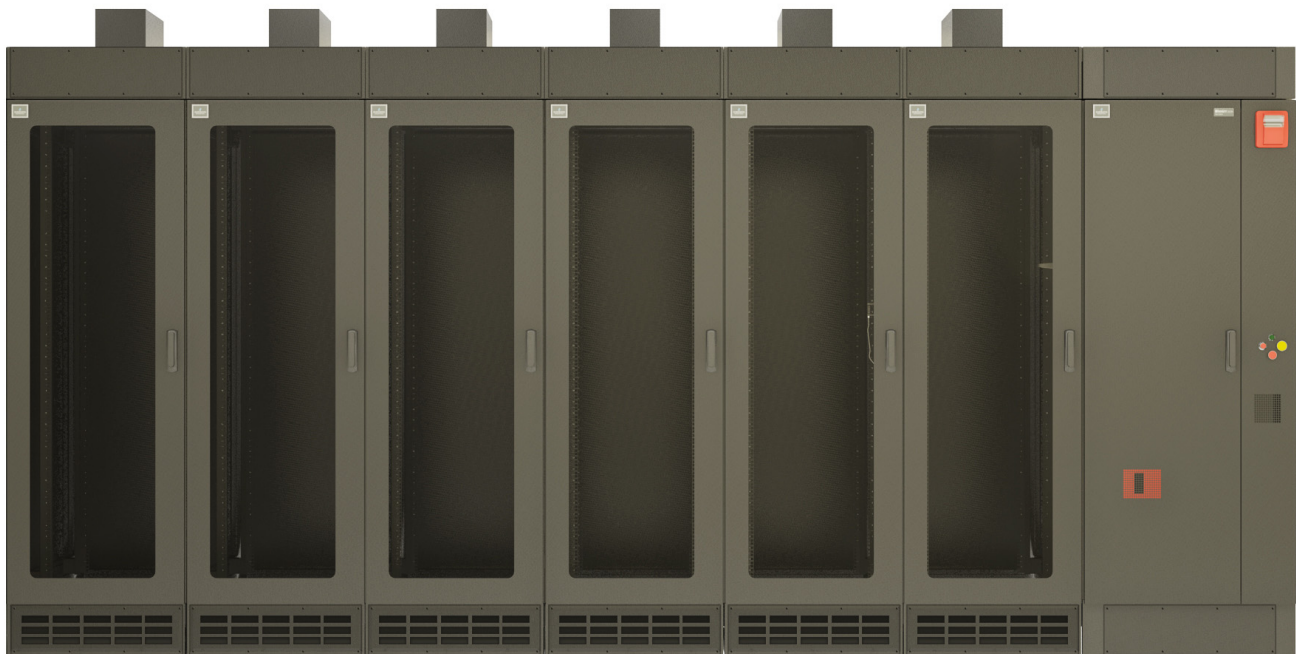


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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions that must be closely followed during installation of this unit to maintain compliance with agency listings. Read all safety and operating instructions before attempting to operate the Liebert DCR. Adhere to all warnings on the unit and in this manual. Follow all operating and user instructions.

This product is designed for commercial / industrial use only. This product is not intended for use with life support or other U.S. FDA designated “critical” devices. Maximum loads must not exceed those specified in this manual.

Install in a clean environment, free from moisture, flammable liquids, gases and corrosive substances. Operate this product in an indoor environment at an ambient temperature between 35°F and 85°F (1.6°C to 29°C). Additionally, units using a remote condenser must be operated at outdoor ambient temperatures of:

- VFD condensers—above 0°F (-18°C)
- Liebert Lee-Temp™ condensers—above -20°F (-29°C)

This product must be connected to and powered by suitable AC supplies, rated in accordance with the unit’s serial tag. It must be properly grounded and protected by circuit breakers or fuses.



NOTE

The Liebert DCR must be installed on a flat, level surface for proper assembly and create tight seals in the components.

Emerson Network Power® recommends using shielded cables for all external communication interfaces.

Ensure that the Liebert DCR has proper ventilation. Never block or insert objects into the ventilation holes or other openings. Maintain minimum clearances as specified in this manual (see **3.1 - Clearance Requirements, Figure 31, and Table 2**).



WARNING

Risk of handling heavy unit. Can cause equipment damage, injury or death.

Read all instructions before beginning.









WARNING

Risk of top-heavy unit falling over. Improper handling can cause equipment damage, injury or death.

Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should attempt to move, lift, remove packaging from or prepare unit for installation.

Read all instructions before attempting to move, lift, remove packaging from or preparing unit for installation.

1.0 GLOSSARY OF SYMBOLS

| | |
|--|---|
|  | Hazardous Voltage Present |
|  | Note Following Instructions |
|  | Consult User Manual for Additional Information |
|  | Indicates Weight |
|  | Indicates Ground Connection |
|  | Indicates Alternating Current |

2.0 INTRODUCTION

The Liebert DCR is an integrated component of the SmartRow offering from Emerson. The Liebert DCR includes a closed-loop, integrated cooling system and fire suppression. Assembly is a matter of connecting the plenums and cabinets, then making electrical and piping connections.

The Liebert DCR must be installed in an indoor, climate-controlled environment. The unit will not protect electronic equipment if it is installed in an environment subject to extreme temperatures or humidity.

This manual is to be used in conjunction with existing Liebert product manuals for each component and site-specific documentation and drawings. User and installation manuals ship with the equipment and are also available at Liebert's Web site: www.liebert.com

2.1 Operational Overview

The Liebert DCR is an enclosed system to house and cool electronic equipment. The DCM™ racks house the critical IT equipment, optional rack power strips and optional rack-mounted UPS units. Cooling air is supplied by an integral Liebert Challenger 3000™ and conveyed to the racks with bottom plenums. Heated exhaust air from the racks returns to the Liebert Challenger 3000 through the top plenums. A Backup Fan System is included to exhaust air in the event of excessive internal temperature.

The DCR Control Panel and Fire Suppression System monitors the air in the Liebert DCR for evidence of combustion. If the smoke detector mounted in the return air plenum senses combustion products, the system control activates audible and visual alarms and releases a fire suppression agent (see **Figure 24**).

2.2 Liebert DCR Components

- DCR Base Plenum-Rack (with Air Flow Adjustment Damper)—one for each DCM rack
- DCR Top Plenum-Rack (with Backup Fan)—one for each DCM rack
- DCR Base Plenum-Challenger—one; installs under the Liebert Challenger 3000 and DCR Control Panel and Fire Suppression System
- DCR Top Plenum-Challenger—one; installs on the Liebert Challenger 3000 and DCR Control Panel and Fire Suppression System
- DCR Control Panel and Fire Suppression System—one; the module consists of the fire detection panel, fire suppression system, override timers, load center, fire strobe/horn and the power/fire control interface
- Liebert Challenger 3000—one (5 ton downflow specially configured for use in this Liebert DCR application)
- DCM rack—minimum of three cabinets and a maximum of six cabinets; Plexiglas® front door, solid rear door, sealed rack design

Table 1 Liebert DCR components and part numbers

| Liebert DCR component | Part # |
|---|---------------|
| DCR Base Plenum—Rack | WO-232521-101 |
| DCR Top Plenum—Rack | WO-232521-200 |
| DCR Base Plenum—Challenger | WO-232521-300 |
| DCR Top Plenum—Challenger | WO-232521-400 |
| DCR Control Panel and Fire Suppression System | WO-232521-500 |

2.3 Liebert Challenger 3000 Notes

- Specially configured for Liebert DCR applications
- Does not include reheat or humidifier
- Includes a condensate pump
- Includes piping and electrical access provisions for local requirements

3.0 PREPARATION

The installation location should be determined and prepared before the Liebert DCR is delivered. Proper planning will permit installing the required power and piping connections and ensuring proper clearances. The installation location must have:

- An indoor, climate-controlled environment with the ambient temperature no higher than 85°F (29°C)
- Sufficient height and clearance from ceilings, walls, fixtures and overhead sprinkler nozzles for the Liebert DCR, including its Backup Fans.



NOTE

The Liebert DCR must be installed on a flat, level surface to maintain proper spacing and provide tight seals. Leaving gaps in the gasket will reduce cooling efficiency, increase energy use and adversely affect fire suppression system operation.

- Heat rejection coolant supply for the Liebert Challenger 3000
- Input power sufficient for:
 - The Liebert Challenger 3000; the cooling unit requires a separate input power feed based on specific model ordered.
 - DCR Control Panel and Fire Suppression System, Backup Fans and IT equipment installed in the DCM racks

For details about any component's requirements, refer to that unit's user manual. The Liebert Challenger 3000 installation manual is SL-11962; the DCM rack user manual is SL-11384; and Liebert iCOM® user manual is SL-18835. These are delivered with the unit and are available at Liebert's Web site: www.liebert.com

3.1 Clearance Requirements

Table 2 Liebert DCR system clearances

| Liebert DCR/Structure Reference Point | Minimum Distance inches (mm) |
|--|---------------------------------|
| Height for Cabinets and Plenums | 96" (2438) |
| Space for Backup Fans (can extend into dropped ceiling) | 12.5" (318) |
| Closest Sprinkler to Any Surface | 18" (457) |
| Liebert Challenger 3000 | 36" (914) |
| Liebert DCR System Front, Rear and Sides | 36" (914) |

3.2 Inspection

Upon receiving a Liebert DCR, examine the packaging for any signs of mishandling or damage. If any damage is noted, notify your local Emerson representative and your carrier immediately.

3.3 Unloading the Liebert DCR

Before unloading the Liebert DCR, refer to the manual for each component, particularly the Liebert Challenger 3000 and DCM racks. These manuals are shipped with the Liebert DCR and are available at the Liebert Web site: www.liebert.com

Read these manuals thoroughly; they include handling instructions and safety notices that must be followed when unpacking, installing and operating the Liebert DCR.

Adhere to all warnings, cautions and installation, operating and safety instructions on the units and in their manuals. Only properly trained and qualified personnel should move, install, operate or service this equipment.

3.4 Required Setup Tools and Equipment

The following tools will be needed to set up a Liebert DCR:

- 3/4" (19mm) open end wrench or socket
- Ratchet to fit sockets
- Phillips head screwdriver
- Flat blade screwdriver
- Forklift or pallet jacks
- Scissors or knife
- Carpenter's level, 3 feet long or longer

3.5 Heat Load Guidelines

NOTICE

Risk of exceeding cooling capability. Can cause equipment damage.

The Liebert Challenger 3000 cooling system in the Liebert DCR is capable of removing 20kW of heat. Exceeding that heat load limit can cause equipment in the cabinets to overheat, resulting in equipment damage and voiding warranties.

The Liebert DCR will accommodate equipment with a combined heat load of 20kW. A single cabinet load should not exceed 6kW. Refer to the values in **Table 3**. The total system capacity and total rack capacity must not be exceeded.

Table 3 Heat load per cabinet

| Number of Cabinets | Heat Load Per Cabinet |
|--------------------|-----------------------|
| 3 | 6kW |
| 4 | 5kW |
| 5 | 4kW |
| 6 | 3kW |

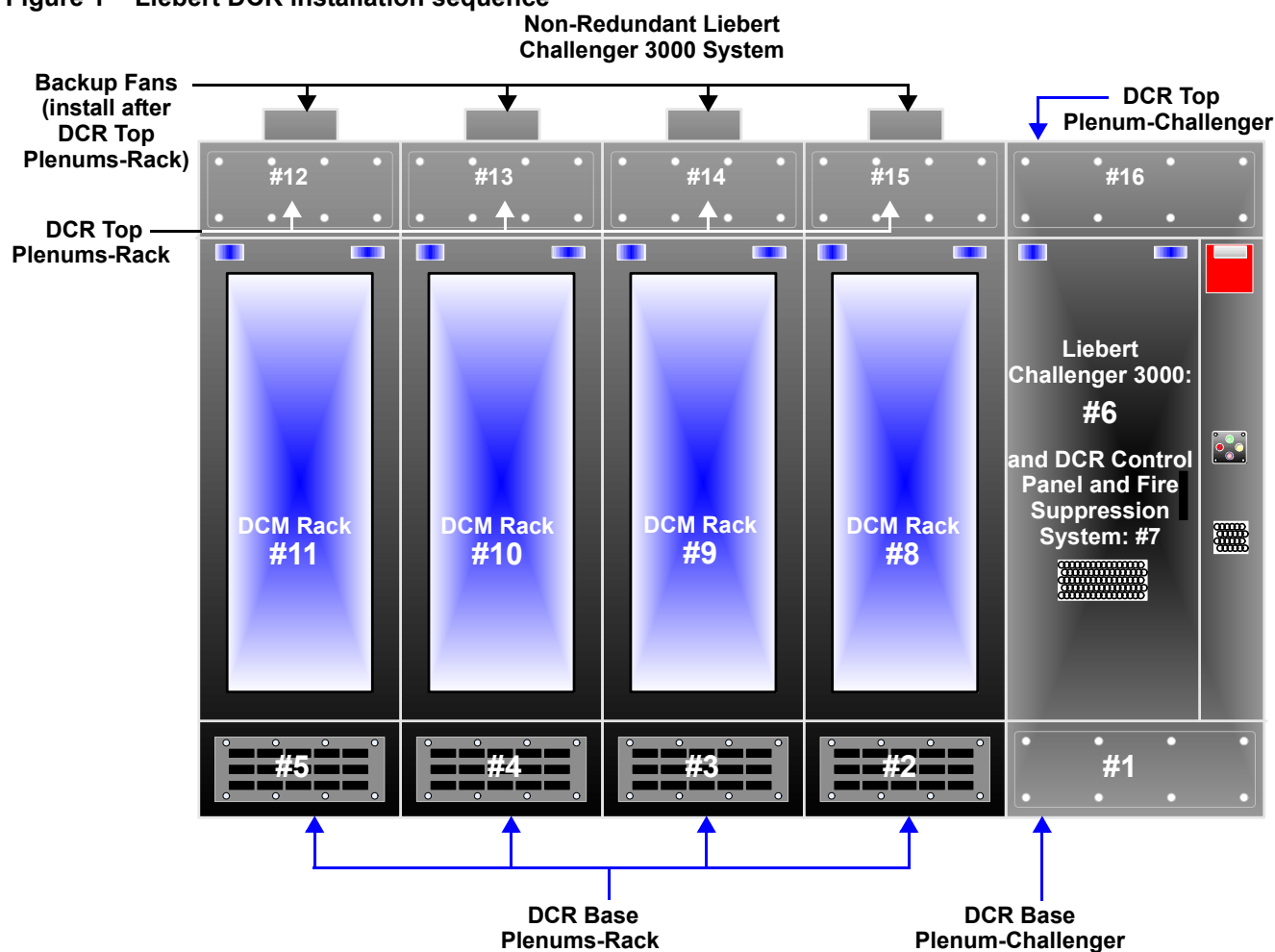
4.0 INSTALLATION

4.1 Assembly Sequence Overview

Assemble the Liebert DCR components in the order below and illustrated in **Figure 1**. For specific procedures, refer to subsequent sections.

- Prepare components
- Apply gaskets (see **Figure 2**)
- Install edge guard
- Base plenum sections
- Liebert Challenger 3000
- DCR Control Panel and Fire Suppression System
- DCM racks
- Top plenum section on Liebert Challenger 3000 and DCR Control Panel and Fire Suppression System
- Top plenum sections on DCM racks
- Backup Fans

Figure 1 Liebert DCR installation sequence



4.2 Install the DCR Base Plenum-Challenger

1. Position the DCR Base Plenum-Challenger where the power and piping connections can be made easily. This component must be installed first and positioning is critical to the remaining installation.

Connections will be made either through the DCR Top Plenum-Challenger or the DCR Base Plenum-Challenger, depending on the Liebert Challenger 3000 system selected. This selection correlates with the selection of a top-fed unit/bottom-fed unit. (The top and base plenums for the primary Liebert Challenger 3000 and DCR Control Panel and Fire Suppression System module are wider than the plenums for the DCM racks. They also have no louvers.)

2. Check the DCR Base Plenum-Challenger installation position to ensure that it meets the required clearances; refer to **Table 2**.

NOTICE

Risk of severe cabinet and system stress. Can cause equipment damage and improper operation.

Do not move the Liebert DCR after assembly. This unit is not designed to be moved after assembly. Movement after assembly will void the warranty and can damage internal components and reduce unit stability.

Floor anchoring, if required, should not be performed until after the entire base plenum assembly has been completely assembled and leveled.

4.3 Assemble the Base Plenum-Racks

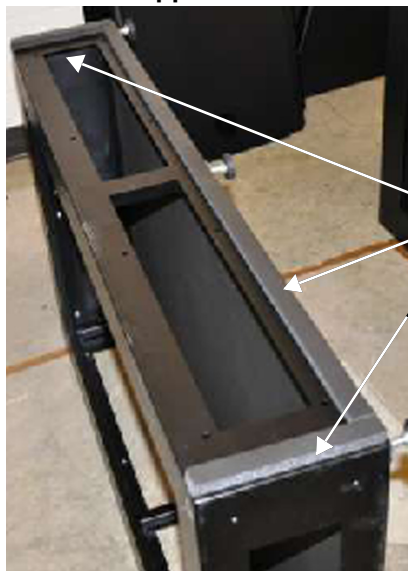
The base plenum supports the Liebert DCR and distributes air to the DCM racks. Place them in the installation location, apply gasket strips to the end facing the DCR Base Plenum-Challenger, attach them together and level the assembly.

1. Apply factory-supplied gasket material (1" x 1/4") to the side of the DCR Base Plenum-Rack that will face the DCR Base Plenum-Challenger (see **Figure 2**).

The gasket must be cut to the correct length to form a good seal that will prevent the cooling air from escaping. Leaving gaps in the gasket will reduce cooling efficiency, increase energy use and adversely affect fire suppression system operation.

2. Use a tool to poke holes in the gasket for screws. Finding the holes is easier from inside the plenum.

Figure 2 Gasket applied to DCR Base Plenum-Rack



Gasket strip must be applied to all four sides of the plenum face; shown during installation, three sides completed

Peel a corner of facing off the gasket and stick it to the plenum surface. Orient the rest of the gasket and apply it. Peel the facing off as required.

Use a tool to poke holes in the gasket for screws. Finding the holes is easier from inside the plenum.



3. Install edge guard on the bottom half of the two plenum openings (see **Figure 3**). Make sure to apply to the left side and the right side of the base plenums.

Figure 3 Edge guard installation



4. Place the first DCR Base Plenum-Rack beside the DCR Base Plenum-Challenger.
Ensure that the side of the DCR Base Plenum-Rack with the gasket faces the primary DCR Base Plenum-Challenger (see **Figure 4**).
The front of each DCR Base Plenum-Rack must be oriented with the rack placement in mind (see **Figure 4**). The front of the DCM racks have a door with a transparent acrylic sheet. The front of the DCR Base Plenum-Rack has louvers.
5. Attach the DCR Base Plenum-Rack to the DCR Base Plenum-Challenger with the factory-supplied 1/4-20 x 3/4 screws. Each DCR Base Plenum-Rack is connected to the plenum assembly with eight internal screws.

**NOTE**

Do not tighten any screws at this time. The screws must remain loose to permit additional assembly steps.

6. Gasket and add edge guard to the remaining DCR Base Plenums-Rack, then attach by screw to the adjacent plenum assembly with the 1/4-20 x 3/4 screws provided; (eight screws per plenum).

Figure 4 Correct orientation of base plenum sections and required side gaskets

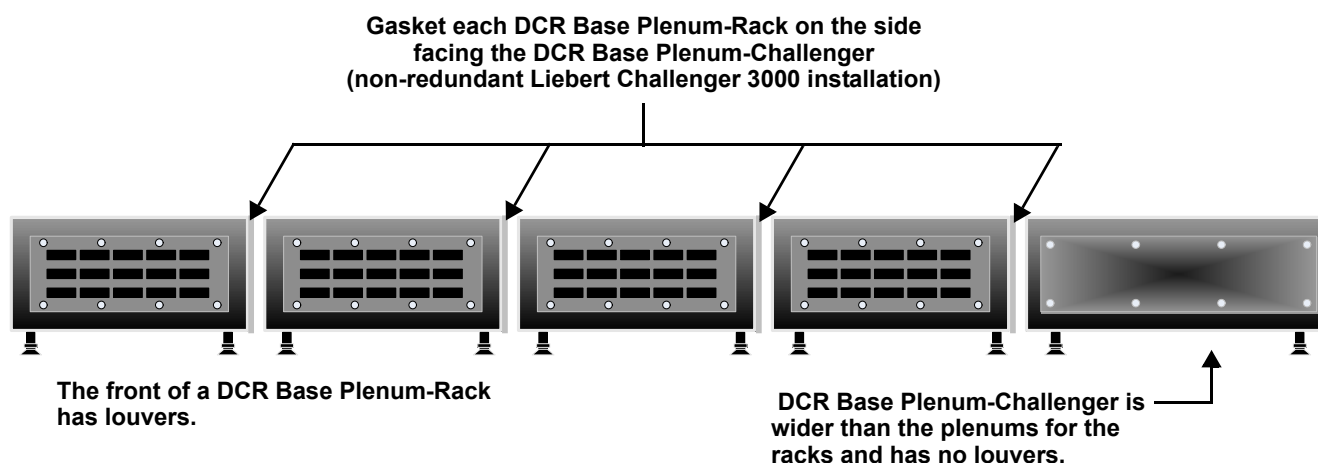
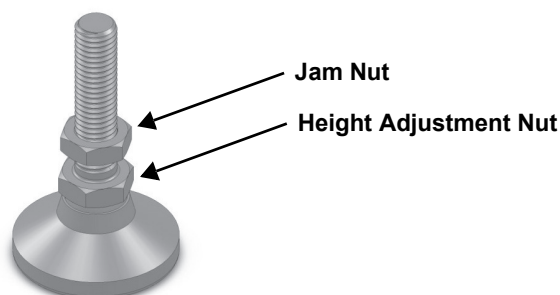


Figure 5 Leveling plenum



7. Use a 3/4" (19mm) wrench to adjust the leveling feet so that the assembled base plenum is level. When the assembly is level, use the 3/4" (19mm) wrench to tighten the jam nuts against the bottom of the plenum assembly to secure the leveling feet.

Figure 6 Leveling foot details



8. Tighten all internal plenum screws installed in **Step 5**.



NOTE

Floor anchoring, if required, should not be done until after all steps above have been completed.

Floor anchoring is optional. Hardware for this step is not included.

4.4 Set the Liebert Challenger 3000 on the Base Plenum-Challenger

Determine how the Liebert Challenger 3000 will be oriented. The cooling unit will fit on the plenum with the Liebert iCOM control panel facing the end of the aisle or to the rear of the aisle.

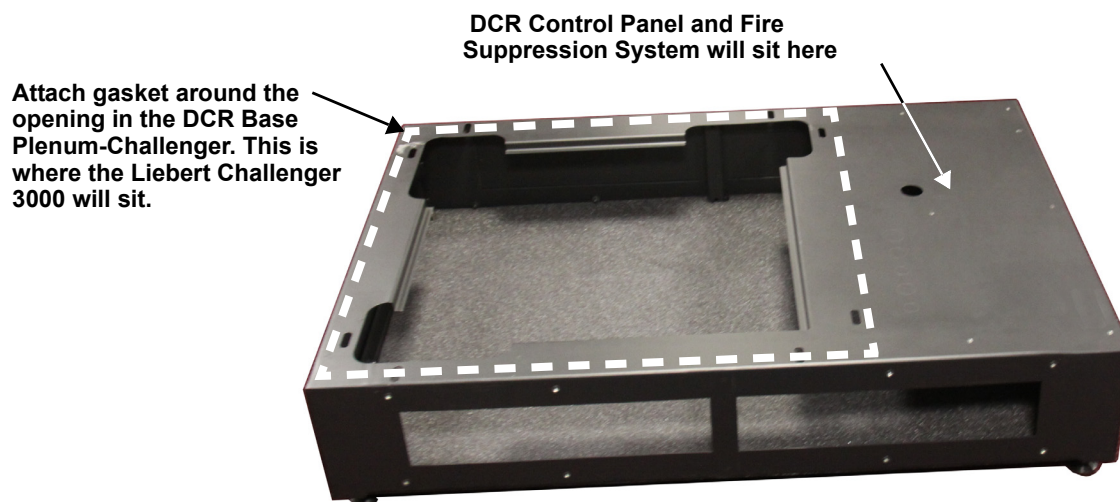
1. Apply the factory-supplied gasket (1"x 5/8") around the opening in the DCR Base Plenum-Challenger—the area where the Liebert Challenger 3000 will sit. Apply gasket only to the area highlighted below in **Figure 7**. This is where the Liebert Challenger 3000 will rest on the plenum.



NOTE

Take care not to damage the gasket when applying it and when setting the Liebert Challenger 3000 on the DCR Base Plenum-Challenger. If the gasket is damaged, the cooling unit must be removed and the gasket replaced. A damaged gasket will permit cooling air to escape, which will reduce cooling efficiency, increase energy use and adversely affect fire suppression system operation.

Figure 7 Apply gasket on the DCR Base Plenum-Challenger



2. Use pallet jacks or similar lifting device to place the Liebert Challenger 3000 on the DCR Base Plenum-Challenger (see **Figure 1**).

The Liebert Challenger 3000 must be aligned with the back of the base plenum that will support it; the Liebert Challenger 3000 also should be flush with the side of the DCR Base Plenum-Challenger.



WARNING

Risk of handling heavy unit. Can cause equipment damage, injury or death.

The Liebert Challenger 3000 weighs more than 555lb. (252kg). If a lifting device is used to move the Liebert Challenger 3000, ensure that it is rated to handle its weight. If personnel will move the unit manually, ensure that an adequate number of personnel are used.

Read all instructions before beginning.

An appropriate number of properly trained and qualified people are required to handle the Liebert Challenger 3000.



WARNING

Risk of top-heavy unit falling over. Improper handling can cause equipment damage, injury or death.

Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should attempt to move, lift, remove packaging from or prepare unit for installation.

Read all instructions before attempting to move, lift, remove packaging from or preparing unit for installation.

3. Secure the Liebert Challenger 3000 using the four supplied carriage bolts, nuts, and washers (see **Figure 8**). The nuts for the carriage bolts must be installed and tightened from underneath the inside of the DCR Base Plenum-Challenger.

Figure 8 Secure the Liebert Challenger 3000 to the DCR Base Plenum-Challenger



Hole in Liebert Challenger 3000 cabinet for carriage bolt

4.5 Set the DCR Control Panel and Fire Suppression System on the Base Plenum



WARNING

Risk of handling heavy unit. Can cause equipment damage, injury or death.

The DCR Control Panel and Fire Suppression System weighs more than 413lb. (187kg). If a lifting device is used to move the DCR Control Panel and Fire Suppression System, ensure that it is rated to handle its weight. If personnel will move the unit manually, ensure that an adequate number of personnel are used.

Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should attempt to move, lift, remove packaging from or prepare the unit for installation.

Read all instructions before attempting to move, lift, remove packaging from or preparing unit for installation.



WARNING

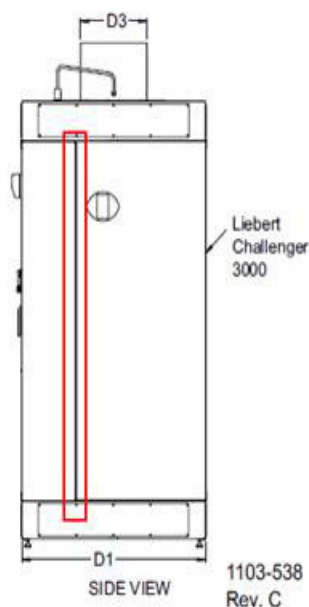
Risk of top-heavy unit falling over. Can cause equipment damage, injury or death.

Read all of the following instructions in the DCR Control Panel and Fire Suppression System manual before attempting to move, lift, remove packaging from or prepare the unit for installation.

The instructions must be adhered to when handling this unit with or without the skid. This the unit could tip over if it is handled improperly.

1. Apply gasket material (1" x 1/4") to the side of the Liebert Challenger 3000 that the DCR Control Panel and Fire Suppression System will rest against (see **Figure 9**). Use a lifting device to place the DCR Control Panel and Fire Suppression System onto the DCR Base Plenum-Challenger.

Figure 9 Gasket material application location



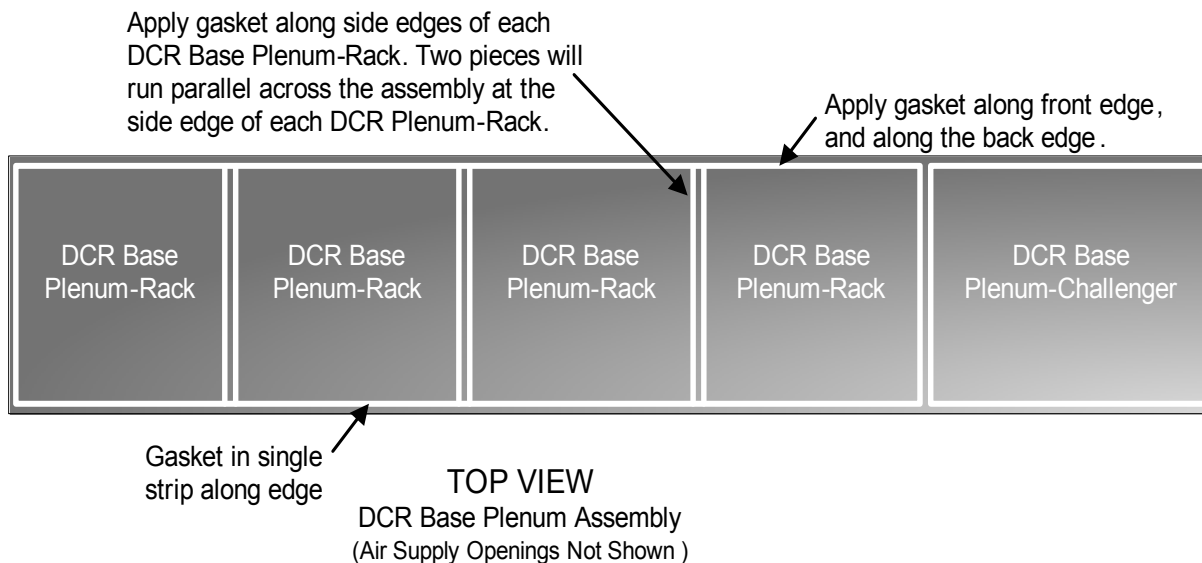
The DCR Control Panel and Fire Suppression System must be aligned with the front of the DCR Base Plenum-Challenger.

The fire suppression section will be flush against the Liebert Challenger 3000 and the end of the DCR Base Plenum-Challenger.

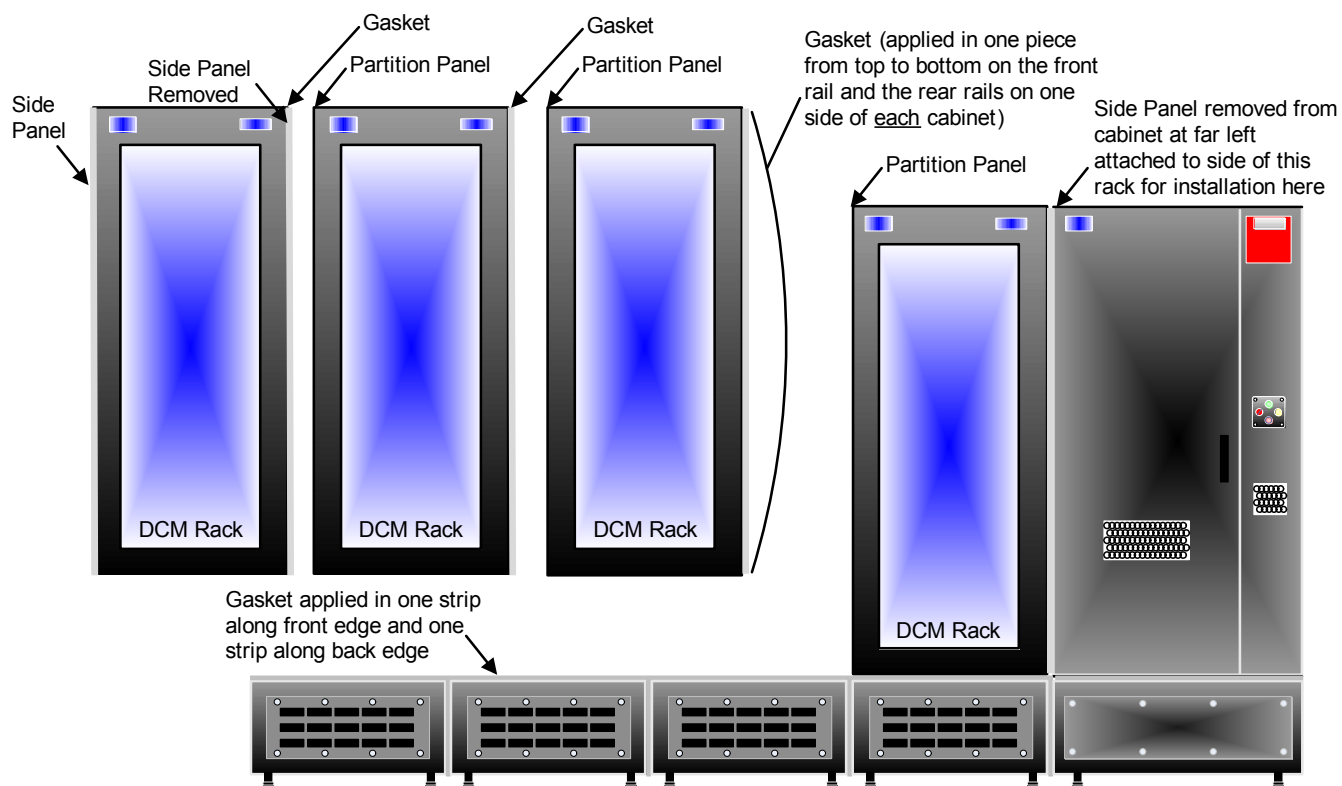
2. Bolt the DCR Control Panel and Fire Suppression System to the base plenum with the factory-supplied 1/4-20 x 3/4 bolts, nuts and washers.

4.6 Install the DCM Racks on the Base Plenum

One of the DCM racks will be shipped from the factory with two side panels attached. The other DCM racks will ship with one partition panel factory installed on the left side of the rack. The panels must be installed as shown in **Figure 11**.

Figure 10 Top gasket applied to base plenum sections

1. Apply the factory-supplied gasket (1" x 1/4") along the perimeter of the surface top of the DCR Base Plenum-Rack assembly. Leaving gaps in the gasket will reduce cooling efficiency, increase energy use and adversely affect fire suppression system operation.
2. Find the DCM rack with two side panels. (One rack will have two side panels; the remaining racks will have a single partition panel factory-installed on the left side of the rack).
3. Remove the side panel from the right side of the cabinet that has two factory-installed side panels. The side panels and partition panels must be installed on the DCM racks as shown in **Figure 10**.
4. Attach the side panel to the right side of another rack. This rack will be the first one installed; it goes next to the Liebert Challenger 3000.

Figure 11 Panel placement in the Liebert DCR

5. Use an adequate number of personnel to set the first DCM rack onto the DCR Base Plenum-Rack closest to the primary DCR Base Plenum-Challenger (see **Figures 1** and **4**). The DCM rack's leveling feet fit into holes in the DCR Base Plenum-Rack. Removing the rack's front and rear doors will lighten the unit, making it easier to maneuver.

When setting DCM racks on the base plenum, be sure to:

- a. Align the front and the rear of the racks.
- b. Space the DCM racks evenly, flush with the front plenums and square with the side of each DCR Base Plenum-Rack.

**NOTE**

Take care not to damage the gasket when applying it and when setting the DCM racks on the base plenum. If the gasket is damaged, the rack must be removed and the gasket replaced. A damaged gasket will permit cooling air to escape, which will reduce cooling efficiency, increase energy use and adversely affect fire suppression system operation.

6. Before installing the next rack, apply the factory-supplied gasket (1" x 1/4") to the aluminum frame extrusion on the left side of each cabinet. Gasket should be installed on the front extrusion and the rear extrusion. The gasket is needed to seal each rack against the adjacent rack.

Figure 12 Applying gasket material to the rack extrusions



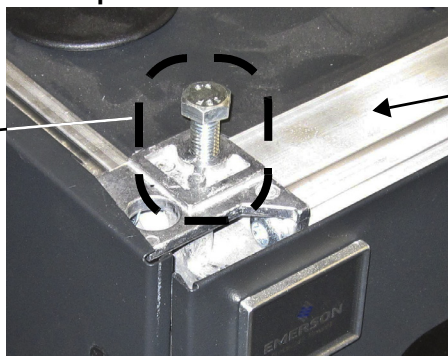
7. Repeat **Steps 5** through **7** for each additional DCR Base Plenum-Rack and DCM rack.

4.7 Mount the DCR Top Plenums-Rack

1. Remove four bolts from the top of each DCM rack; there is one bolt in each corner. Retain the bolts for attaching the DCR Top Plenums-Rack to the top of the racks.

Figure 13 Remove bolts from DCM rack top

Bolts in each corner of each DCM rack. The bolts will be used to secure the DCR Top Plenums-Rack to the cabinets.



The gasket should be applied to top aluminum extrusion frame piece.

2. Apply factory-supplied gasket (1" wide by 1/4" thick) around the perimeter of the top aluminum extrusion frame piece of each rack (see **Figure 10**).

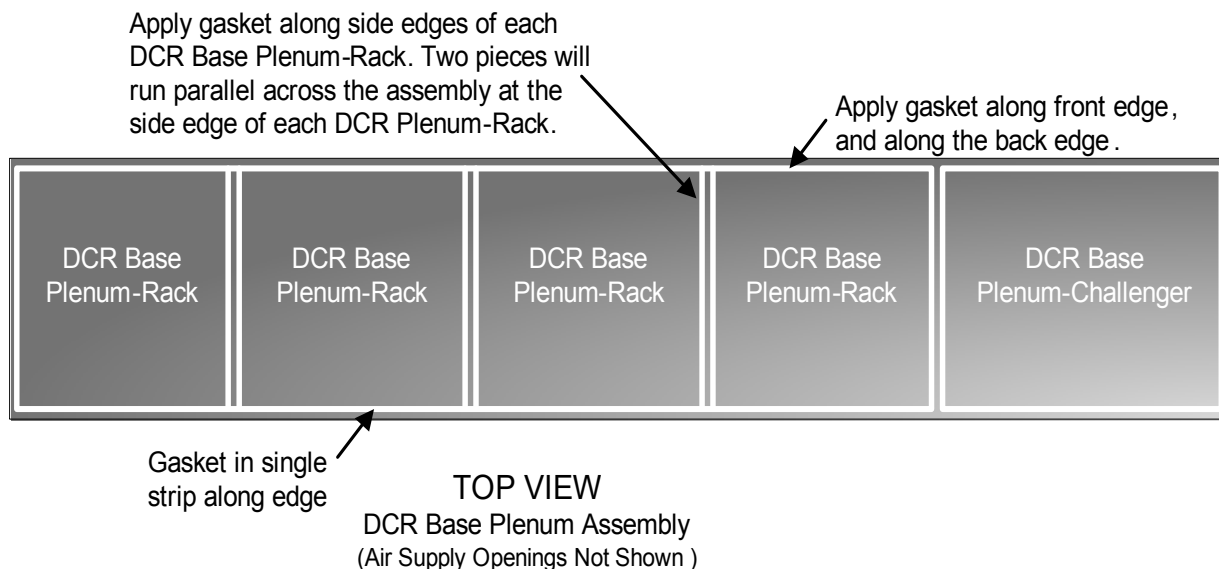
**NOTE**

Do not extend the gasket on the racks onto the Liebert Challenger 3000. The Liebert Challenger 3000 requires a different, thicker gasket material.

3. Apply factory-supplied gasket material (1" x 1/4") to the side of the DCR Top Plenum-Rack that will face the DCR Top Plenum-Challenger (see **Figure 2**).

The gasket must be cut to the correct length to form a good seal that will prevent the cooling air from escaping. Leaving gaps in the gasket will reduce cooling efficiency, increase energy use and adversely affect fire suppression system operation.

4. Install edge guard on the bottom half of the two plenum openings (see **Figure 3**). Make sure to apply to the left side and the right side of the top plenums.

Figure 14 Gasket application to top of DCM racks

5. Set the DCR Top Plenum-Rack on the DCM rack farthest from the Liebert Challenger 3000 (the last rack installed). The side of DCM rack must be flush with the outer face of the DCR Base Plenum-Rack.
6. Attach the DCR Top Plenum-Rack to the DCM rack with the four bolts removed in **Step 1**.

**NOTE**

When attaching additional top plenum on top of the DCM racks, be sure to align each of the racks with each other. The sections must form a straight line or they cannot be bolted together.

7. Punch holes through the gasket on the face of the DCR Top Plenum-Rack for the 10 screws that will connect it to the adjacent DCR Top Plenum-Rack.
8. Insert 10 screws through the holes and into the captive nuts in the adjacent DCR Top Plenum-Rack. Do not tighten the screws until the DCR Top Plenum-Rack assembly is fully installed.
9. Repeat **Steps 2** through **8** for each of the remaining DCR Top Plenums-Rack. There is one DCR Top Plenum-Rack for each DCM rack.
10. Apply factory-supplied gasket (1" wide by 5/8" thick) to the edges of the Liebert Challenger 3000 and the DCR Control Panel and Fire Suppression System.
11. Set the DCR Top Plenum-Challenger on the top of the Liebert Challenger 3000 and DCR Control Panel and Fire Suppression System and secure it with six factory-supplied 1/4-20x3/4 bolts.

**NOTE**

Take care not to damage the gasket when applying it and when setting the DCR Top Plenum-Challenger on the top of the Liebert Challenger 3000 and DCR Control Panel and Fire Suppression System. If the gasket is damaged, the cooling unit must be removed and the gasket replaced. A damaged gasket will permit cooling air to escape, which will reduce cooling efficiency, increase energy use and adversely affect fire suppression system operation.

12. Tighten the bolts securing the plenum assembly to the racks and to each other. There are 14 bolts to tighten in each DCR Top Plenum-Rack: four bolts in each corner and ten screws in the face of each plenum section.

4.8 Installing and Wiring Sensors

- Top Plenum Thermostat—Activates Backup Fans
- Supply Air Temperature Sensor—For supply air temperature control
- Remote Temperature Sensors—Senses air temperature in each rack for load-balancing
- Smoke Detector—Senses combustion products in the return air to activate the fire suppression

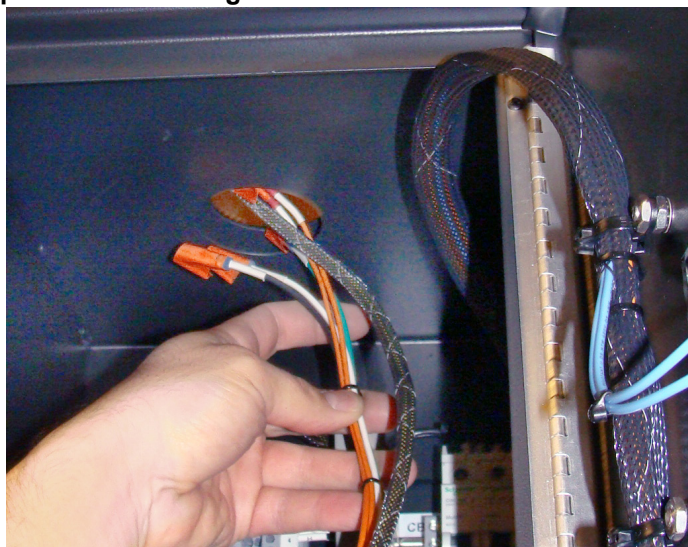
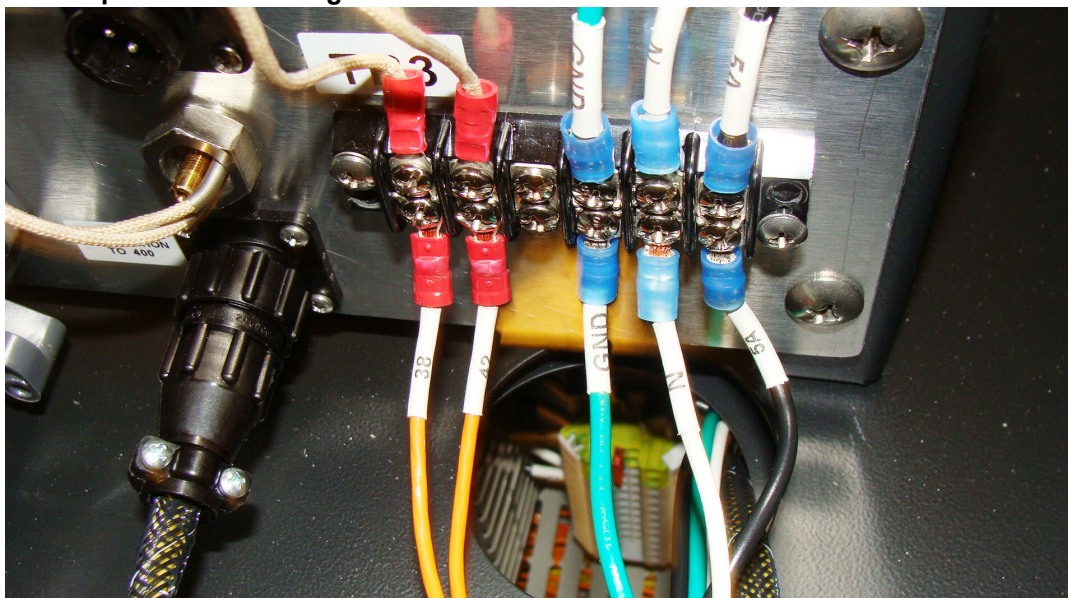
4.8.1 Wiring the Top Plenum Thermostat and Backup Fan Receptacle

The Top Plenum Thermostat is factory-installed in the DCR Top Plenum-Challenger.

Wiring for this thermostat must be connected in order for it to function. There is also an L5-20 receptacle installed on the exterior of the DCR Top Plenum – Challenger that supplies power for the Backup Fans. The wiring harness consists of 5 wires (2 for the Top Plenum Thermostat and 3 for the input power for the Backup Fans) is located inside the DCR Control Panel. The wiring must be fed through the grommet in the top of the DCR Control Panel and Fire Suppression System and into the DCR Top Plenum-Challenger and connected as shown in **Figure 15**. Connect wires to the corresponding terminals on TB3 as shown in **Figure 16**.

**NOTE**

The Top Plenum Thermostat is used to activate the Backup Fans if the return air temperature reaches 87°F (30°C).

Figure 15 Wiring DCR Top Plenum-Challenger**Figure 16 DCR Top Plenum-Challenger**

4.8.2 Connecting the Smoke Detector

The Smoke Detector is located in the Top Plenum-Challenger. It senses combustion products in the return air to activate the fire suppression system. The wiring harness is shipped in the DCR Control Panel and Fire Suppression System. It must be fed through a grommet and into the Top Plenum-Challenger. Connect the four-pin female cable connector to the bottom four-pin male connector as shown in **Figure 17**.

Figure 17 Smoke Detector connections



4.8.3 Install Supply Air Temperature Sensor

Install a Supply Air Temperature Sensor in the DCR Base Plenum-Rack assembly (one for each Liebert Challenger 3000). This type of sensor works best when it is 5ft. (1.5m) or farther from the Liebert Challenger 3000. The Supply Air Temperature Sensor is wired to the Liebert iCOM at the factory. It is on the center shelf of the Liebert Challenger 3000 (see **Figure 18**).

Cut the wire ties and route the wiring down and out the bottom base plate of the Liebert Challenger 3000 and into the second DCR Base Plenum-Rack from the Liebert Challenger 3000.

Figure 18 Supply Air Temperature Sensor

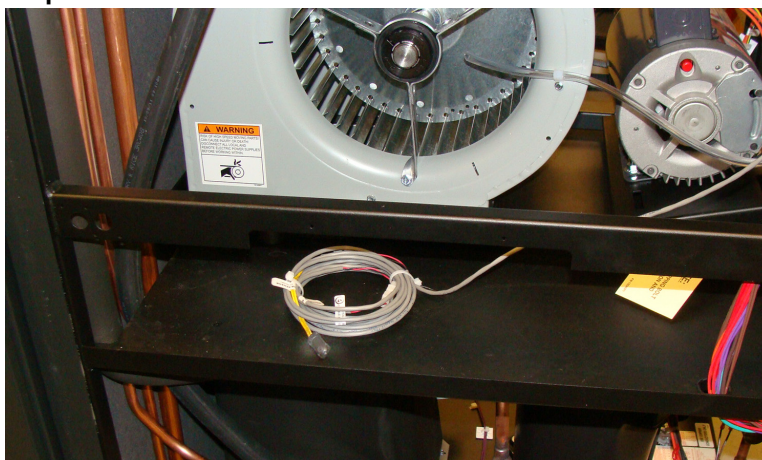
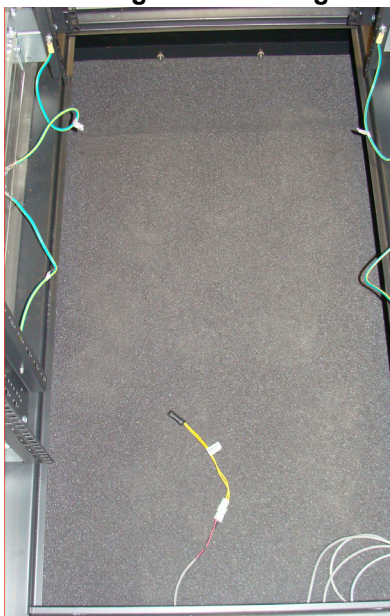


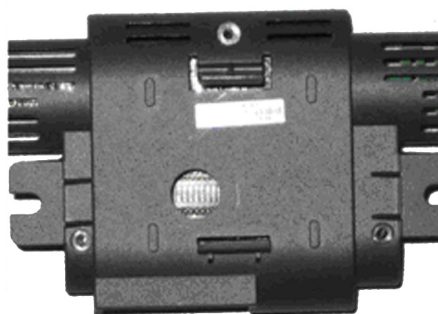
Figure 19 Supply Air Temperature Sensor wiring routed through base plenum



4.8.4 Install Remote Temperature Sensors

Install a Remote Temperature Sensor in the front of the racks and near the top of each DCM cabinet (one per DCM cabinet). The sensors are daisy-chained and the wiring routed into the DCR Top Plenum-Rack, then connected to the Return Air Sensor in the Liebert Challenger 3000. A Remote Temperature Sensor and a 12-foot (3.7m) cable are provided with each DCM cabinet.

Figure 20 Remote Temperature Sensor

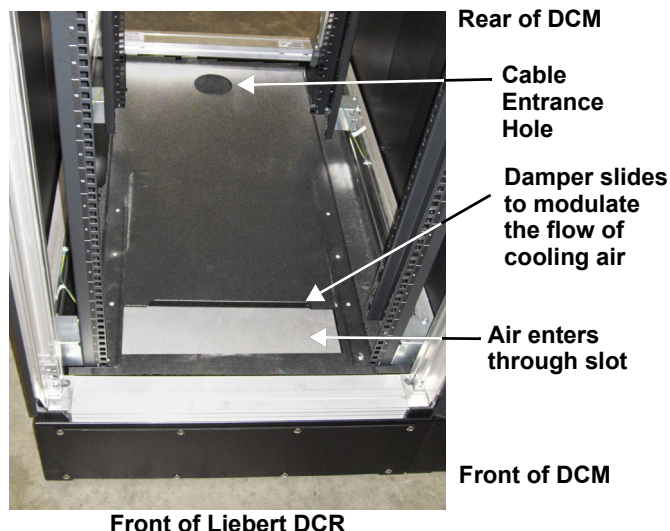


4.9 Insert and Adjust Air Flow Adjustment Dampers

1. Insert an Air Flow Adjustment Damper into the bottom of each DCM rack. These panels can be installed from the front or rear of the rack, but the opening in the damper must be at the front of the rack and the cable entrance hole must be at the rear (see **Figure 21**).

Figure 21 Air Flow Adjustment Damper installation

Air Flow Adjustment Damper being inserted from rear of the DCM rack (can be installed from the front or rear)



2. The Air Flow Adjustment Dampers must be opened varying amounts to provide adequate cooling to each DCM rack.

**NOTE**

The cooling air flow required by the equipment in a DCM rack will vary according to several factors, especially the distance from the Liebert Challenger 3000 and each rack's heat load.

- a. Vary the amount that each Air Flow Adjustment Damper is opened with smaller openings closest to the Liebert Challenger 3000, and progressively larger openings toward the end of the row of DCM racks.
- b. After the Liebert DCR is operational, the temperature in each DCM rack must be rechecked with the racks' doors closed. Failing to check the rack temperature with the doors closed will result in inaccurate readings that may adversely affect cooling.
- c. Reposition the Air Flow Adjustment Dampers to equalize the cooling in each rack.
- d. Close the racks' doors and recheck the cooling levels (this can be done with the Remote Temperature Sensors that will be connected to the Liebert iCOM's CANbus). The Liebert iCOM will accommodate up to 10 Remote Temperature Sensors.

**NOTE**

The rear cable access hole should be sealed if is not used.

4.10 Install Backup Fan Assemblies

1. Install all Backup Fan assemblies on the DCR Top Plenums-Rack (refer to **Figure 22**).
 - a. Lay the top cover plates on the top of the Top Plenum-Rack. The plates are sized to permit positioning the fan assemblies to avoid interfering with sprinklers and other structural features.
 - b. Set the Backup Fan assemblies onto the cover plates and bolt each into place with self-tapping sheet metal screws (5/16" heads).
 - c. Use the factory-supplied self-tapping screws to attach the spacer plates to the DCR Top Plenums-Rack.
2. Repeat **Step 1** to install Backup Fan assemblies for each DCM cabinet.
3. Plug the remaining Backup Fans into the receptacle of the adjoining Backup Fan housing (see **Figure 22**).
4. Plug the first Backup Fan into the receptacle on top of the Top Plenum-Challenger.

Figure 22 Install and connect Backup Fans

Movable plates on DCR Top Plenum-Rack; these are sized to permit numerous positions for the Backup Fan. These plates are not bolted to the plenum; bolts on additional plates and on the Backup Fan hold them in place.

Power Connection for Backup Fan on adjacent DCM rack

Power Cord for Backup Fan

Power cord for the Backup Fan connected to the receptacle on the Top Plenum-Challenger

The top cover plates can be positioned to permit proper placement of the fan. These two have holes for self-tapping sheet metal screws to connect them to the DCR Top Plenum-Rack and to secure the Backup Fan assembly.



NOTE

The sealed system's integrity, as well as cabinet seals, must be maintained. All cable entry holes must be sealed before the Liebert DCR is started.

4.11 Air/Ventilation Management

Empty rack space in the DCM racks must be blocked with blanking panels. Blocking the open space helps optimize system cooling performance by minimizing short cycling of conditioned air.

Heat loads should be balanced as well as possible among the cabinets. This can be done by distributing equipment evenly among the cabinets to avoid excessive heat concentration. Refer to **Table 3** for details.

4.11.1 Ventilation Requirements

- The maximum room temperature recommended for the Liebert DCR is 85°F (29°C).
- If the room is sealed, the air inlet opening size from the building should be 1.5 ft² (0.14m²) per rack. For example, six cabinets require an inlet grille or transfer duct of 9 ft² or 3' x 3' (0.84m²).
- If the ceiling space is not open to the rest of the building, a damper or grille of 1.5 ft² (0.14m²) per rack will be required.
- Conditioned space recommended and a non-condensing environment is required.

Backup Fan Notes

The Backup Fans for each rack will move nominally 800cfm (380 l/s) of air and are powered from the DCR Control Panel and Fire Suppression System through a factory-installed L5-20 receptacle on top of the DCR Top Plenum - Challenger.

If the Liebert DCR is installed in a dedicated room and airflow inlet and outlet openings to the room are not provided, the backup fans will remove cabinet heat for only a short time.

5.0 POWER CONNECTIONS

5.1 Power Connections to Liebert Challenger 3000

Provide input power to the Liebert Challenger 3000 on its own dedicated circuit based on the specific Liebert Challenger 3000 configuration requirements. Input power to the Liebert Challenger 3000 must not be connected through the 225A load center in the DCR Control Panel and Fire Suppression System. Refer to the Liebert Challenger 3000 user manual that shipped with the unit and is available at Liebert's Web site: www.liebert.com

For electrical and piping connections, the Liebert Challenger 3000 can be top-fed, bottom-fed or a combination of the two. Connections are made through the knockouts in the bottom of the Liebert Challenger 3000 electrical panel/box. For top access, power wiring is routed through the Liebert Challenger 3000 top piping chase.

NOTICE

Risk of improper power input. Can cause equipment damage or degraded cooling.

The Liebert Challenger 3000 must be powered separately by a dedicated circuit. Power must not be supplied from the 225A load center panel because of potential electrical noise problems.

5.2 Input Power Wiring Alternatives to DCR Control Panel and Fire Suppression System and Rack Equipment

The load center located inside the DCR Control Panel and Fire Suppression System requires connection to 120/208VAC, 3-phase, 5-wire only.

Two 20A branch breakers are supplied for:

- DCR Control Panel and Fire Suppression System (which in turn powers the Backup Fans)
- Liebert DCR controls

The user must supply branch breakers, whips and wiring for all rack equipment, including optional rack power strips, rack UPS's and general connectivity.



NOTE

The user must connect the Backup Fans, Backup Fan controls and the Liebert DCR controls to a UPS power source.

To determine if an electrical disconnect is required to be installed in conjunction with the use of the Liebert DCR, consult local codes and agency requirements.

5.2.1 Single Bus—Liebert DCR Load Supplied by a Single UPS

The UPS that will supply input power to the load center inside the DCR Control Panel and Fire Suppression System and the rack equipment must be rated to support the load.

1. Connect the UPS to the DCR Control Panel and Fire Suppression System load center.
2. Use customer-supplied whips to route power from the load center panel board to the individual racks as required.
3. Once power is routed to the racks, optional rack power strips can be installed and plugged in to distribute power to the rack equipment.
4. Connect Backup Fans.

5.2.2 Single Bus—Liebert DCR Load Supplied by UPS in Each Rack

1. Connect utility input power to the load center in the DCR Control Panel and Fire Suppression System.
2. Use customer-supplied whips to route input power from the load center panel board to each rack UPS as required.
3. Once power is routed to the rack UPS's, rack power strips can be installed and plugged in to distribute power to the rack equipment.
4. Connect Backup Fans to the UPS in the rack or to rack power strips connected to the UPS in the rack.
5. Connect the DCR Control Panel and Fire Suppression System controls and the Liebert DCR controls to a UPS.

5.2.3 Dual Bus—Liebert DCR Load Supplied by Utility Power and Single UPS or by Two UPS's

1. Connect utility input power or a UPS to the load center in the DCR Control Panel and Fire Suppression System.
2. Connect equipment on Circuit A to output power from the load center panelboard.
3. Connect equipment on Circuit B to separate external panelboard fed from a second UPS or utility power.
4. Connect Backup Fans in a daisy chain to the connection on top of the DCR Top Plenum-Challenger (L5-20R).
5. Wire Circuit A and Circuit B (refer to **Figure 33**).

5.3 Routing Power to Rack loads

Rack equipment can be powered either with a stand-alone UPS or with rack-mounted UPS's in each DCM rack. Either method requires installing whips from the load center in the DCR Control Panel and Fire Suppression System and routed to each rack as required.

Powering with Stand-Alone UPS

- Stand-alone UPS connected to the load center in the DCR Control Panel and Fire Suppression System with whips routed to each DCM rack
- Optional rack power strips connected to the whips
- Rack equipment connected to the optional rack power strips

Powering with Rack-Mounted UPS's

- Separate rack-mounted UPS's in each DCM rack
- Rack-mounted UPS's connected to the whips from the load center
- Rack equipment connected to the optional rack power strips

6.0 LIEBERT iCOM CONTROLS SETUP

The Liebert iCOM provides control of the Liebert Challenger 3000 and monitoring of conditions in the DCM racks. If more than one Liebert DCR is installed, the Liebert iCOMs can be networked so that each can be viewed or controlled from a single location.

Field-wiring is required for the Liebert iCOM, even if it is part of a stand-alone unit, as in a single Liebert DCR. Refer to the Liebert Challenger 3000 installation manual, SL-11962, or to the Liebert iCOM user manual, SL-18835. The manuals are available at the Liebert Web site: www.liebert.com

The Liebert Challenger 3000 with Liebert iCOM has Liebert IntelliSlot® plug-in slots for use with optional communication cards:

- Ethernet Web/SNMP Card
- RS-485 Modbus Card

The hot-swappable cards provide interfaces supporting open protocols, including Modbus, HTTP (Web) and SNMP. See the Liebert Web site for the latest supported protocols, Modbus reference information and SNMP MIBs: www.liebert.com

6.1 Connecting Remote Temperature Sensors

A Liebert iCOM will accommodate one Remote Temperature Sensor per rack. The sensors should be placed inside the DCM racks, in the front and near the top. They should be placed where they will monitor the temperature of the supply air to each rack.

The Remote Temperature Sensors should be connected as outlined in the Liebert Challenger 3000 manual, SL-11962, and the Liebert Challenger ITR manual, SL-11963.

The DIP switches on the Remote Temperature Sensors should be set as shown in **Figure 23**.

Figure 23 DIP switch location on the Remote Temperature Sensors board

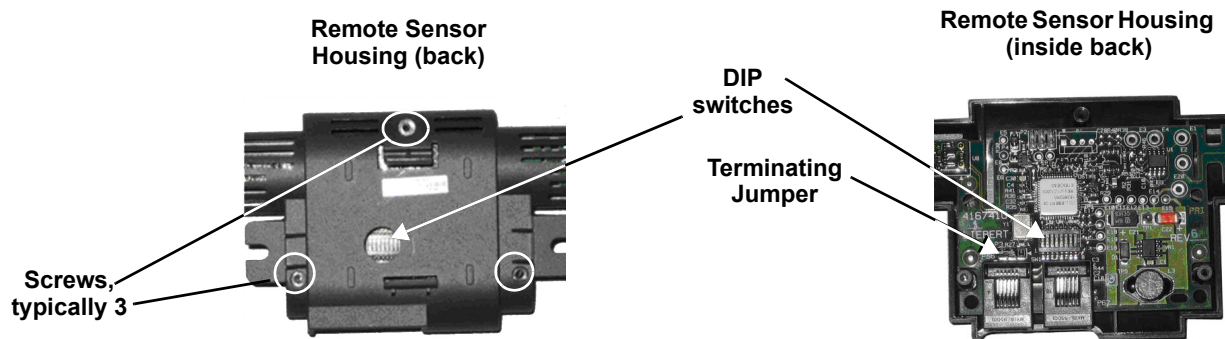


Table 4 DIP switch settings on Remote Temperature Sensor board

| Remote Sensor # | DIP Switch Position | | | | | | | |
|-----------------|---------------------|-----|-----|-----|----|-----|-----|-----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | Off | Off | On | Off | On | Off | Off | Off |
| 2 | On | Off | On | Off | On | Off | Off | Off |
| 3 | Off | On | On | Off | On | Off | Off | Off |
| 4 | On | On | On | Off | On | Off | Off | Off |
| 5 | Off | Off | Off | On | On | Off | Off | Off |
| 6 | On | Off | Off | On | On | Off | Off | Off |
| 7 | Off | On | Off | On | On | Off | Off | Off |
| 8 | On | On | Off | On | On | Off | Off | Off |
| 9 | Off | Off | On | On | On | Off | Off | Off |
| 10 | On | Off | On | On | On | Off | Off | Off |

6.2 Liebert iCOM Setting Changes for Liebert DCR Installation

The Liebert Challenger 3000 utilizes the Liebert iCOM and digital scroll technology to vary cooling capacity based on equipment demand. The Liebert iCOM will make capacity adjustments based on supply air conditions to ensure that the rack equipment always receives consistent cooling air temperature. To accommodate this control type, an Emerson-trained technician will must make changes to the Liebert iCOM control settings (see **Table 5**).

During normal operation, the Liebert Challenger 3000 will handle all cooling requirements of the equipment in the Liebert DCR. If the return air reaches 87°F (30°C), Backup Fans will be activated to bring outside air into the Liebert DCR until the high-temperature situation is resolved. This will require a trained technician to make changes in the Liebert iCOM alarm settings to prevent nuisance alarms from occurring (see **Table 5**).

Table 5 Liebert iCOM setting changes for Liebert DCR installation

| Liebert iCOM Control Key | Parameter | Default | Change To | Alarm Type | Change To |
|--------------------------|-------------------------------|---------|-----------|------------|-----------|
| S124 | Supply Sensor | Disable | Control | — | — |
| S125 | Supply Setpoint | 60°F | 65°F | — | — |
| S202 | Return Sensor Alarms | Enable | — | — | — |
| S203 | High Return Temperature | 80°F | 87°F | — | — |
| S232 | Warning Activates Alarm Relay | Yes | No | — | — |
| S233 | Water Alarm Shuts Unit Down | No | — | — | — |
| S236 | MAIN FAN OVERLOAD | Enable | — | Alarm | — |
| S237 | LOSS OF AIRFLOW | Enable | — | Alarm | — |
| S238 | Clogged Filters | Enable | — | Warning | Message |
| S239 | High Room Temp | Disable | Enable | Warning | — |
| S243 | High Temp Sensor A | Disable | — | Warning | Warning |
| S249 | COMP 1 OVERLOAD | Disable | — | Alarm | Warning |
| S250 | COMP 2 OVERLOAD | Disable | — | Alarm | Warning |
| S251 | COMP 1 High Pressure | Enable | — | Alarm | Warning |
| S252 | COMP 2 High Pressure | Enable | — | Alarm | Warning |
| S253 | COMP 1 Low Pressure | Enable | — | Alarm | Warning |
| S254 | COMP 2 Low Pressure | Enable | — | Alarm | Warning |
| S255 | COMP 1 Pumpdown Fail | Enable | — | Alarm | Warning |
| S256 | COMP 2 Pumpdown Fail | Enable | — | Alarm | Warning |
| S257 | DIG SCROLL1 HIGH TEMP | Enable | — | Alarm | Warning |
| S258 | DIG SCROLL2 HIGH TEMP | Enable | — | Alarm | Warning |
| S262 | WORKING HRS EXCEEDED | Enable | Disable | Warning | — |
| S264 | WATER UNDER FLOOR | Enable | — | Alarm | Warning |
| S265 | COND PUMP-HIGH WATER | Enable | — | Alarm | Warning |
| S266 | LOSS OF FLOW | Enable | — | Alarm | Warning |
| S267 | STBY GLYCOL PUMP ON | Enable | — | Alarm | Warning |
| S268 | STANDBY UNIT ON | Enable | — | Alarm | Warning |
| S275 | CUSTOMER INPUT 1 | Enable | — | Alarm | Warning |
| S276 | CUSTOMER INPUT 2 | Enable | — | Alarm | Warning |
| S277 | CUSTOMER INPUT 3 | Enable | — | Alarm | Warning |
| S278 | CUSTOMER INPUT 4 | Enable | — | Alarm | Warning |
| S279 | CALL SERVICE | Enable | — | Alarm | Warning |
| S280 | HIGH TEMPERATURE | Enable | — | Alarm | Warning |

7.0 DCR CONTROL PANEL AND FIRE SUPPRESSION SYSTEM OVERVIEW

7.1 General Installation Considerations

The DCR Control Panel and Fire Suppression System module contains the fire detection panel, fire suppression system, override timers, load center, fire strobe/horn and power/fire control interface.

The DCR Control Panel and Fire Suppression System has been fully tested and certified at the factory.

The DCR Control Panel and Fire Suppression System is designed to meet all national codes, however, local fire officials may impose additional requirements. Contact your local fire official for further information.

The DCR Control Panel and Fire Suppression System is shipped with wiring that requires field-connection to the shutdown circuits of the Liebert Challenger 3000 and any UPS systems in the racks. These connections must be made during installation of the Liebert DCR to ensure proper operation of the emergency power Off circuits.

Under NFPA 2001, systems protected by a clean fire-suppression agent can be left with the UPS and HVAC systems operational at the discretion of the owner and local fire officials.

The DCR Control Panel and Fire Suppression System should be field-connected as a separate zone to the building fire detection system.

If the Liebert DCR is installed in a dedicated room, an additional strobe and horn may be installed at the entrance to the room. Contact your local authorized service representative if required.

7.2 DCR Control Panel and Fire Suppression System Commissioning

A local qualified service representative will conduct final fire suppression system commissioning and arming. Before the service representative arrives for commissioning, the following must be completed:

- The permanent 120VAC power must be available and On to the DCR Control Panel and Fire Suppression System.
- The building fire alarm must be tied in (Alarm, Trouble and Supervisory).
- The Liebert Challenger 3000 EPO (emergency power off) shutdown must be tied in.
- The Liebert DCR must be fully installed and operational, including remote emergency power-off tie-in and timers.

7.3 DCR Control Panel and Fire Suppression System Component Locations

Figure 24 DCR Control Panel and Fire Suppression System, exterior features

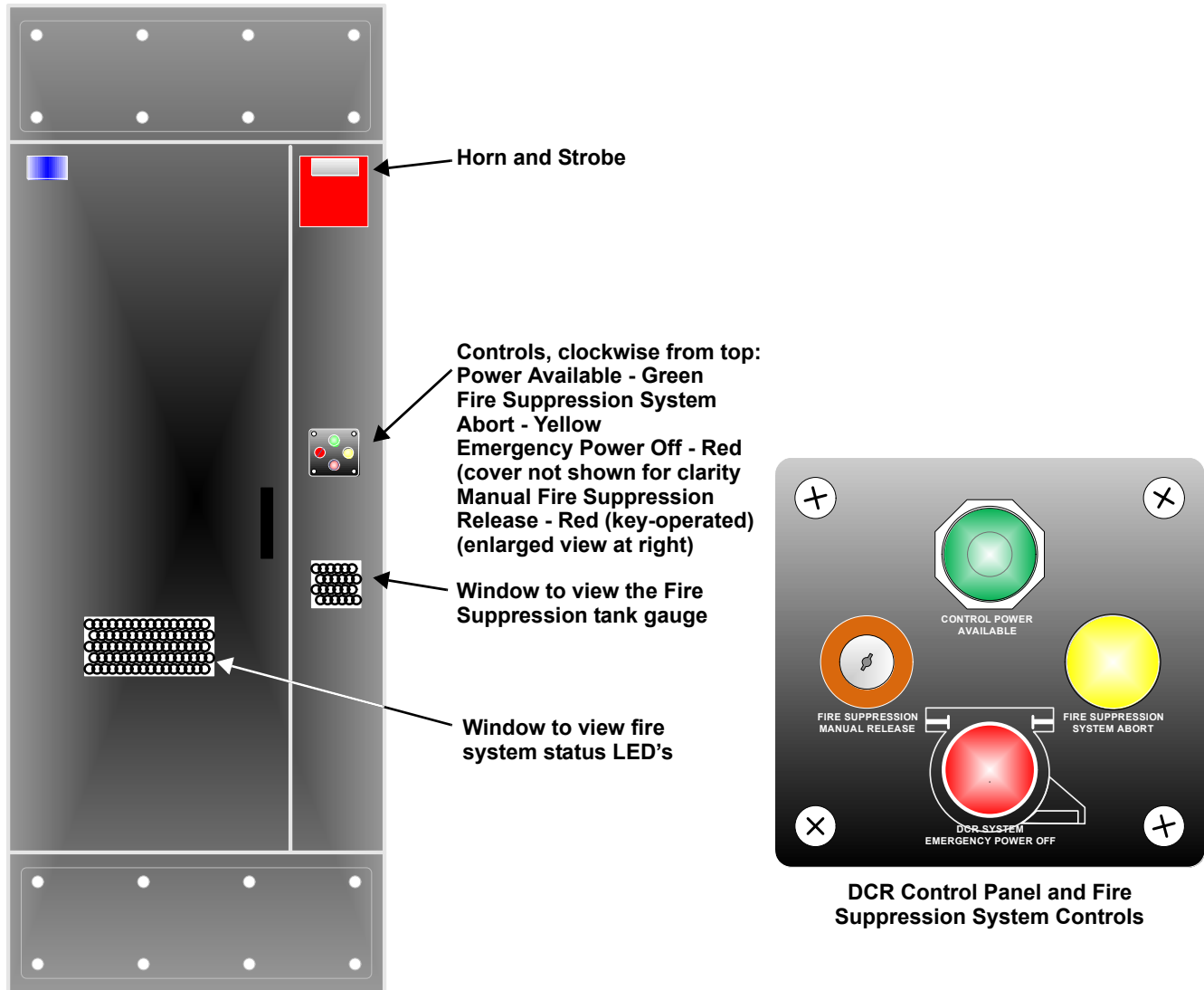
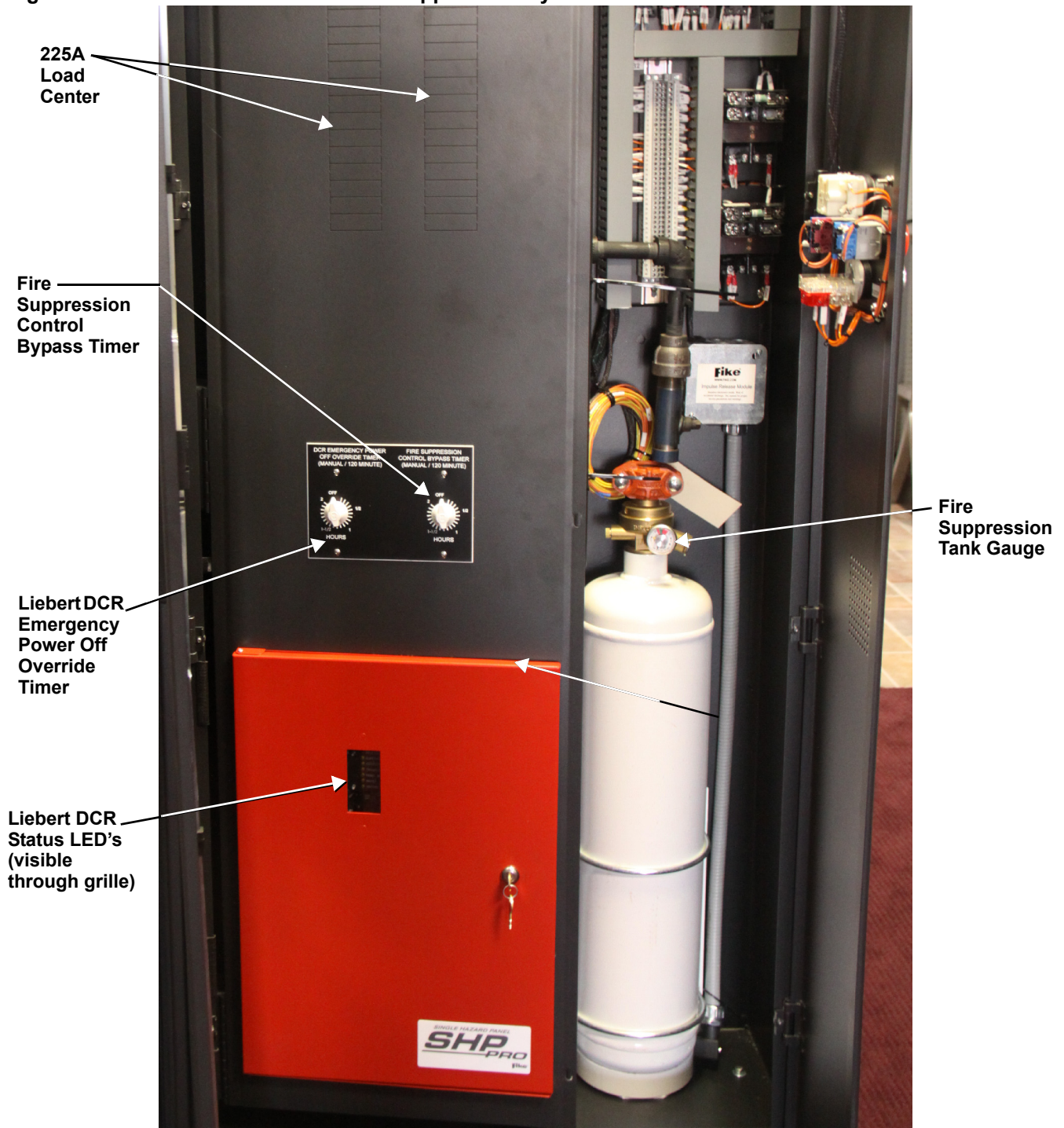


Figure 25 DCR Control Panel and Fire Suppression System internal features



7.4 Fire Detection and Suppression System Operation Overview

The DCR Control Panel and Fire Suppression System monitors the air in the Liebert DCR for evidence of combustion. If the smoke detector mounted in the top return air plenum senses combustion products, the system activates the audible horn and visual strobe on the upper right corner of DCR Control Panel and Fire Suppression System panel (see **Figure 24**).

After a 30-second delay, the system releases fire-suppression agent into the cabinets, locks out the Backup Fans and shuts down any connected UPS's and the Liebert Challenger 3000. This sequence may differ if NFPA 2001 is applicable and coordinated with the local fire officials.

NFPA 2001 authorizes discretion of the owner and local fire officials to leave UPS and cooling systems operational when the system is protected by a clean fire-suppression agent.

The DCR Control Panel and Fire Suppression System should be field-connected as a separate zone to the building fire detection system.

7.4.1 Local Emergency Power Off Override and Fire Suppression Control Bypass Timers

Two timers inside the front panel of the DCR Control Panel and Fire Suppression System assist in restarting the UPS and cooling systems and allowing for service of the fire panel without shutting down the system (see **Figures 25** and **26**). These are:

- Local Emergency Power Off Override Timer
- Fire Suppression Control Bypass Timer

Local Emergency Power Off Override Timer

If either the local, optionally connected External Emergency Power Off buttons or fire detection system is activated, the normally closed circuit opens, shutting down the system. After the fire alarm panel has been cleared or the Emergency Power Off button has been disengaged, turning this timer past the 1/2 hour position temporarily returns the system to Normally Closed. Once power is restored, the UPS's and Liebert Challenger 3000 can be restarted.

Fire Suppression Control Bypass Timer

To allow servicing the DCR Control Panel and Fire Suppression System, this timer is turned to its maximum position by a qualified service representative. The timer provides a normally closed circuit bypassing the internal, normally closed relays in the fire suppression panel. Once the timer expires, the circuit is returned to its normal setting (Off).

Figure 26 DCR Control Panel and Fire Suppression System timers



8.0 INSTALLATION CHECKLIST

8.1 Cooling and Power Component Installation Checklist

- ☐ 1. All cabinets and plenums have been installed.
- ☐ 2. All gaskets and edge guard are installed.
- ☐ 3. All electrical and piping connections have been made.
- ☐ 4. All cabinet doors close and seal securely.
- ☐ 5. All Emergency Power Off interlocks to the UPS's and to the Liebert Challenger 3000 are connected.
- ☐ 6. All external Emergency Power Off and fire detection connections have been made, if applicable.
- ☐ 7. All rack power strips are installed and connected to the load center for external UPS configurations and to UPS outputs for internal UPS configurations, if applicable.
- ☐ 8. Fire suppression controls and the Liebert DCR controls connected to a UPS.
- ☐ 9. Liebert Challenger 3000 has been started-up and factory-commissioned.
- ☐ 10. UPS's have been installed and are operational.
- ☐ 11. Emergency Power Off has been tested and verified to shut down systems as designed.
- ☐ 12. Bypass timer for emergency power override works.
- ☐ 13. All external cable and piping entrances are sealed.
- ☐ 14. All rack supply air dampers are open and customer has adjusted the dampers to distribute the air based on the heat load in each cabinet.
- ☐ 15. Remote Temperature Sensors are installed at the top front of each the DCM cabinet.
- ☐ 16. Supply Air Temperature Sensor is installed in the DCR Base Plenum-Rack.
- ☐ 17. The Liebert iCom displays the supply air temperature.
- ☐ 18. All monitoring points are communicating to the Network Management System.
- ☐ 19. Computer equipment is installed so that the heat load is evenly distributed among the DCM racks.
- ☐ 20. Power and temperature monitoring are fully operational.
- ☐ 21. Perform all installation checks as stated in manuals for Liebert DCR components: Liebert Challenger 3000, Liebert iCOM, UPS's and rack power strips. Each UPS and Liebert Challenger 3000 must be started before the fire suppression system can be activated.

8.2 Fire Suppression System Installation Checklist

- ☐ 1. Is permanent 120VAC power available and on?
- ☐ 2. Is the Building Fire Alarm tied in?
 - ☐ a. Alarm
 - ☐ b. Trouble
 - ☐ c. Supervisory
- ☐ 3. Is the Fire Suppression tank installed?
- ☐ 4. Is the pipe installed?
- ☐ 5. Is the nozzle installed?
- ☐ 6. Is the Liebert Challenger 3000 EPO tied-in?
- ☐ 7. Is the EPO timer installed?
- ☐ 8. Is the EPO tied-in?
- ☐ 9. Is the Liebert DCR installation complete and the Liebert DCR operational?

8.2.1 Contacting Representative to Arm the Fire Suppression System

Do not call to have the Fire Suppression system commissioned until all of the items in **8.1 - Cooling and Power Component Installation Checklist** and **8.2 - Fire Suppression System Installation Checklist** have been completed.

The local company arming the system cannot turn the system on until all the items above have been completed. Scheduling the local distributor prior to these items being completed may result in additional charges.

After the tasks above have been completed, the fire suppression system should be commissioned.

9.0 STARTUP

9.1 Initial System Startup and Activation

The Liebert DCR's initial startup will be performed by Emerson personnel along with the associated, qualified fire suppression service personnel. The initial startup should be scheduled after all installation steps have been completed and the unit is ready for startup and commissioning.

Shutdowns for maintenance and other reasons require the Liebert DCR to be restarted according to the instructions in **9.2 - System Startup and Activation**.



NOTE

The DCR Control Panel and Fire Suppression System is shipped from the factory with the solenoid activator disconnected and without the nozzle placed in the supply airstream. The fire suppression system should be commissioned after the UPS's, rack power strips and Liebert Challenger 3000 have been commissioned and are fully operational.

9.2 System Startup and Activation

The Liebert DCR is configured to start when power is connected.

9.3 Balancing Cooling Air Distribution

Cooling is simplified if the heat load in the Liebert DCR is balanced among the cabinets. Installing multiple devices that generate more heat in one or two cabinets will produce more heat in those cabinets, requiring more cooling. See **3.5 - Heat Load Guidelines** for guidelines on the Liebert DCR's heat-removal capability.

Check the Liebert iCOM to determine the Remote Temperature Sensor readings from each DCM. If the Remote Temperature Sensor air readings are too high in one or more cabinets, reposition the Air Flow Adjustment Dampers to equalize the cooling.

- Balance inlet air dampers for each cabinet. Adjust the dampers to equalize the leaving air temperature of each rack. Refer to **Figure 10** for adjustment details.
- If the Remote Temperature Sensor reading of a rack is lower than the average leaving air temperature of the other racks, close the inlet damper slightly to reduce cooling air flow.
- Conversely, if the Remote Temperature Sensor reading of a rack is higher than the average leaving air temperature of the other racks, open the inlet damper slightly to reduce cooling air flow.
- Recheck the Remote Temperature Sensor reading via of the Liebert iCOM and adjust the dampers further as required.

9.4 Restarting after DCR Control Panel and Fire Suppression System Has Shut Down

If the DCR Control Panel and Fire Suppression System Rack Supply has shut down:

1. Turn Emergency Power Off Override timer beyond the 1/2 hour position (see **Figures 25 and 26**).
2. Confirm that input power is available.
 - a. If the Liebert DCR is powered by a stand-alone Liebert UPS and will not restart, put the UPS in bypass and restart the remaining equipment. Call 800-543-2378 for assistance in putting the UPS in bypass and for service support. For a Liebert three-phase UPS, call 800-543-2378 and for a Liebert single-phase UPS, call 800-222-5877, option #1.
 - b. If the Liebert DCR controls, Backup Fans and Backup Fan controls are connected to rack-mounted UPS's, manually restart the UPS's.

The DCR Control Panel and Fire Suppression System have an internal battery for the fire suppression system. The system will continue operating on this battery up to 24 hours unless power is restored earlier.

The Liebert Challenger 3000 is set up to restart when power is restored.

10.0 TROUBLESHOOTING

Table 6 Troubleshooting

| Problem/Alarm | Recommended Action |
|--|--|
| Cabinet Overheating | Ensure that the Liebert Challenger 3000 is operating. |
| | Adjust cooling setpoints to increase cooling. |
| | Check for proper cooling air flow. |
| | Adjust Air Flow Adjustment Dampers to increase cooling in warmer cabinets. |
| | Check that the load is evenly distributed between racks and individual racks are not overloaded. |
| Fire Detection System in Alarm Condition | Call Emerson Network Power Solutions Applications at 800-222-5877, option #1. |
| Liebert Challenger 3000 in alarm | Refer to a properly trained and qualified service representative or consult the Liebert Challenger 3000 operation and maintenance manual, SL-11963, shipped with the Liebert DCR and available at Liebert's Web site: www.liebert.com . For assistance, call 800-543-2778. |
| If UPS System has shut down | Turn Emergency Power Off Override timer beyond the 1/2 hour position (see Figures 25 and 26) and restart the UPS. If the Liebert DCR is powered by a stand-alone 3-phase Liebert UPS and will not restart, put the UPS in bypass and restart the remaining equipment. Call 800-543-2738 for assistance in putting the UPS in bypass and for service support. |
| | If the Liebert DCR has an internal rack-mounted, single-phase Liebert UPS, call 800-222-5877, option # 1 for assistance. |
| If Liebert Challenger 3000 has shut down | The Liebert Challenger 3000 will restart automatically once power has been restored. For assistance, call 800-543-2778. |

11.0 MAINTENANCE

11.1 Liebert Challenger 3000

The air conditioning system should be checked quarterly by an Emerson-certified technician. The trained technician who started your system is available to provide maintenance and on-site support.

11.2 Fire Detection and Suppression System

The cylinder should be checked monthly to ensure it remains properly charged. The cylinder gauge must be in the green area. If it is not, contact your local fire suppression service representative.

The complete fire suppression system should be inspected every six months by a licensed fire detection company.

11.3 Liebert DCR System Inspection

The enclosure protected by the clean suppression agent must be thoroughly inspected at least once a year to determine if penetrations or other changes have occurred that could cause the suppression agent to leak or otherwise change its volume. Any conditions that could reduce the clean agent concentration must be corrected.

A yearly enclosure inspection is not required if a documented administrative control program exists that addresses barrier integrity.

The enclosure of all total flooding systems must be examined and tested to locate any significant air leaks that could result in a failure of the enclosure to hold the specified agent concentration level for the specified holding period.



NOTE

Installation must maintain the sealed system's integrity, as well as cabinet seals. All cable entry holes must be sealed.

11.4 UPS's and Rack Power Strips

The UPS's should be checked at least twice a year. Liebert Services can be contacted at 800-543-2378.

For a single-phase Liebert UPS, rack power strips and DCM racks, call 800-222-5877, option #1. Outside North America call +00800 1155 4499; or e-mail: liebert.upstech@emerson.com

For a three-phase UPS and power systems, call 800-543-2378; outside North America call 614-841-6598. For information about the warranty, contact your local Emerson representative or go to www.liebert.com

11.5 Electrical System

All electrical components, including the load center breakers, should be inspected at least twice a year by a licensed electrical contractor. Any loose connections should be tightened.

12.0 REDUNDANT LIEBERT CHALLENGER 3000 OPTION

A second Liebert Challenger 3000 can be added to the Liebert DCR for redundant cooling. The redundant cooling unit would operate only when the primary cooling unit is Off.

A DCR Control Panel Shell-Redundant Challenger option (WO-232521-600) is installed in front of the redundant Liebert Challenger 3000. (Only one primary DCR Control Panel and Fire Suppression System is required; it is installed in front of the primary Liebert Challenger 3000.) The redundant cooling unit requires a Base Plenum-Challenger and a Top Plenum-Challenger. These plenum sections must be attached to the plenum assembly (see **Figure 27**).

12.1 Liebert iCOM Setup for Redundant Liebert Challenger 3000

Refer to the Liebert iCOM manual, SL-18835, for setting up the unit for a redundant Liebert Challenger 3000.

12.2 Install a Redundant Liebert Challenger 3000

To install a redundant Liebert Challenger 3000:

1. Remove the side access plates on the base and top plenum sections on the end where the redundant Liebert Challenger 3000 will be installed.
2. Apply gasket (1" x 1/4") to the side of the DCR Base Plenum-Challenger facing the primary Liebert Challenger 3000.
3. Install edge guard on the bottom half of the two plenum openings of the DCR Base Plenum-Rack.
4. Attach the DCR Base Plenum-Challenger to the DCR Base Plenum-Rack with the eight factory-supplied screws.
5. Level the DCR Base Plenum-Challenger.
6. Apply the factory-supplied gasket (1" x 5/8") around the top opening in the DCR Base Plenum-Challenger—the area where the redundant Liebert Challenger 3000 will sit (see **Figure 7**).

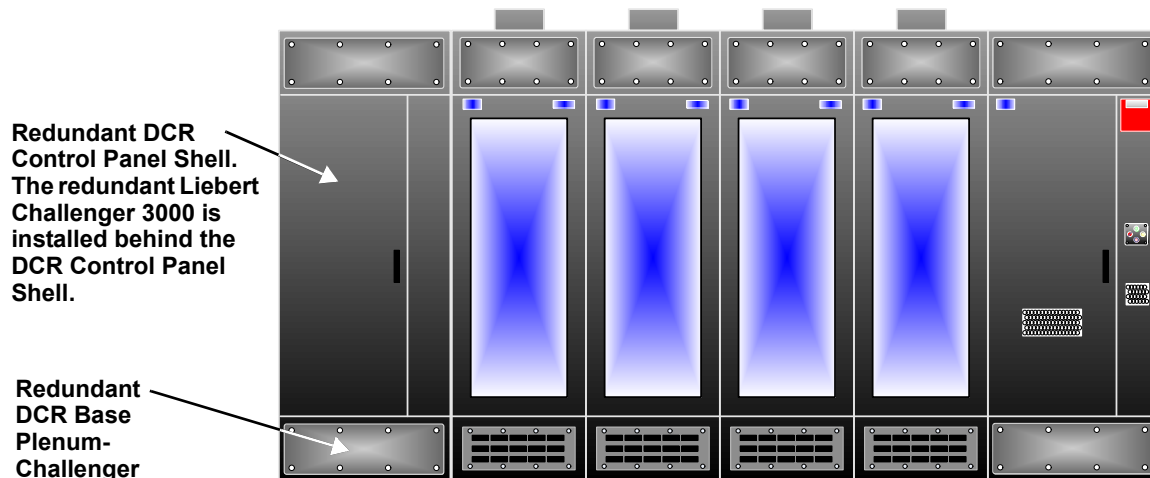


NOTE

Take care not to damage the gasket when applying it and when setting the Liebert Challenger 3000 on the DCR Base Plenum-Challenger. If the gasket is damaged, the cooling unit must be removed and the gasket replaced. A damaged gasket will permit cooling air to escape, which will reduce cooling efficiency, increase energy use and adversely affect fire suppression system operation.

7. Use pallet jack or similar lifting devices to place the redundant Liebert Challenger 3000 on the DCR Base Plenum-Challenger.

The Liebert Challenger 3000 must be aligned with the back and outer edge of the base plenum that will support it.

Figure 27 Redundant Liebert Challenger 3000 option arrangement

8. Secure the Liebert Challenger 3000 using the four factory-supplied carriage bolts (see **Figure 8**).
9. Apply gasket material (1" x 1/4") to the side of the Challenger that the DCR Control Panel will rest against (see **Figure 9**)
10. Use a pallet jack to lift the DCR Control Panel Shell onto the base plenum with the redundant Liebert Challenger 3000 (see **Figure 1**).
The redundant DCR Control Panel Shell must be aligned with the front of the base plenum. The redundant DCR Control Panel Shell will be flush with the end of the base plenum.
11. Bolt the redundant DCR Control Panel Shell to the base plenum with the six factory-supplied 1/4-20x3/4 bolts.
12. Apply gasket (1" x 1/4") to the side of the Top Plenum-Challenger facing the primary Liebert Challenger 3000.
13. Install edge guard on the bottom half of the two plenum openings of the Top Plenum-Challenger.
14. Apply gasket (1" x 5/8") around the top of the redundant Liebert Challenger 3000 and the redundant DCR Control Panel Shell.
15. Set the DCR Top Plenum-Challenger on the top of the redundant Liebert Challenger 3000 and DCR Control Panel Shell and secure it with six 1/4-20x3/4 bolts.

**NOTE**

Take care not to damage the gasket when applying it and when setting the DCR Top Plenum-Challenger on the top of the Liebert Challenger 3000 and DCR Control Panel Shell. If the gasket is damaged, the cooling unit must be removed and the gasket replaced. A damaged gasket will permit cooling air to escape, which will reduce cooling efficiency, increase energy use and adversely affect fire suppression system operation.

16. Move the sampling tube for the Smoke Detector to the opposite side of the top plenum of the redundant Liebert Challenger 3000. The sampling tube must be in the entrance of the return air to the Liebert Challenger 3000.
17. Route the two wires from the Top Plenum Thermostat located in the redundant DCR Top Plenum-Challenger through the DCR Top Plenum-Racks back over to the primary DCR Top Plenum-Challenger. Run wires through the grommet located on top of the DCR Control Panel and Fire Suppression panel. These wires must be connected to TB2 on Pins 9 and 10 (see **Figures 15** and **35**).
18. A 20-foot (6m) cable is shipped inside the DCR Top Plenum-Challenger for the Smoke Detector. One end is factory-installed to a four-pin female connector. The other end must be connected to the top four-pin male connector in the primary DCR Top Plenum-Challenger (see **Figure 16**).
19. Cut the wire ties for the Supply Air Temperature Sensor and route the wiring down and out the bottom base plate of the redundant Liebert Challenger 3000 and over into the second DCR Base Plenum-Rack from the Liebert Challenger 3000.

13.0 TECHNICAL INSTALLATION ILLUSTRATIONS

Figure 28 Liebert DCR component arrangement

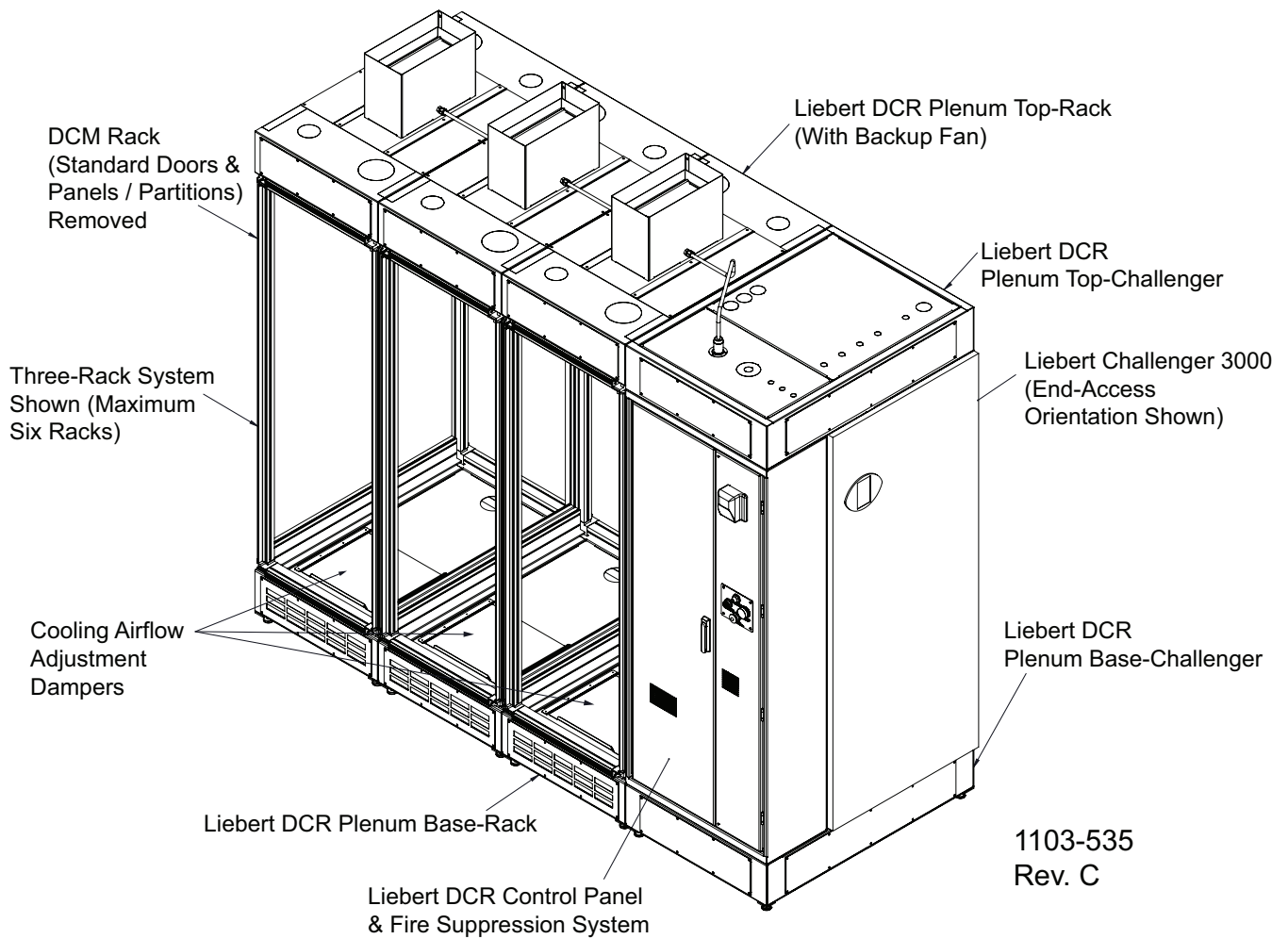


Figure 29 DCR Control Panel and Fire Suppression System components

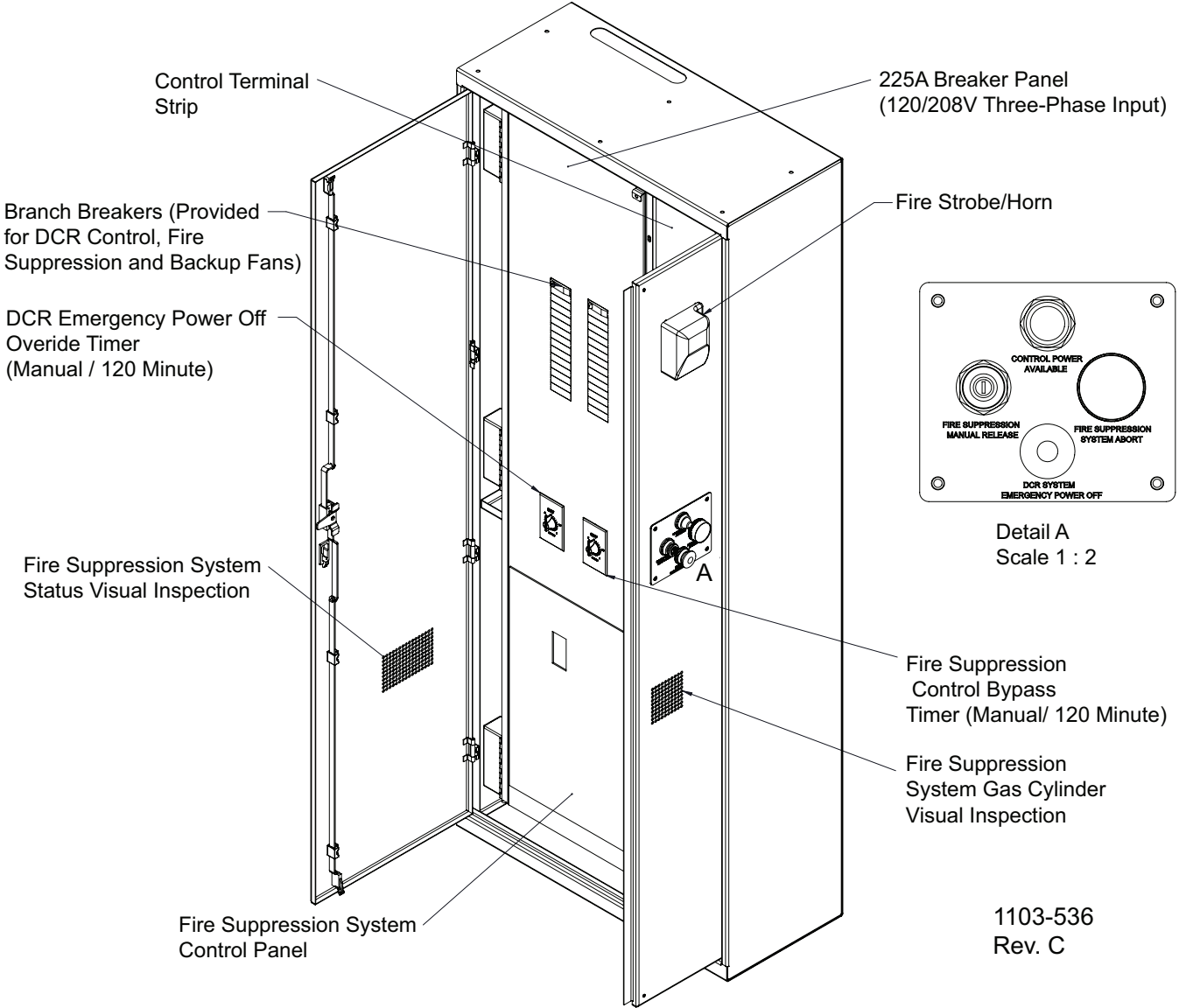


Figure 30 Liebert DCR access and connections

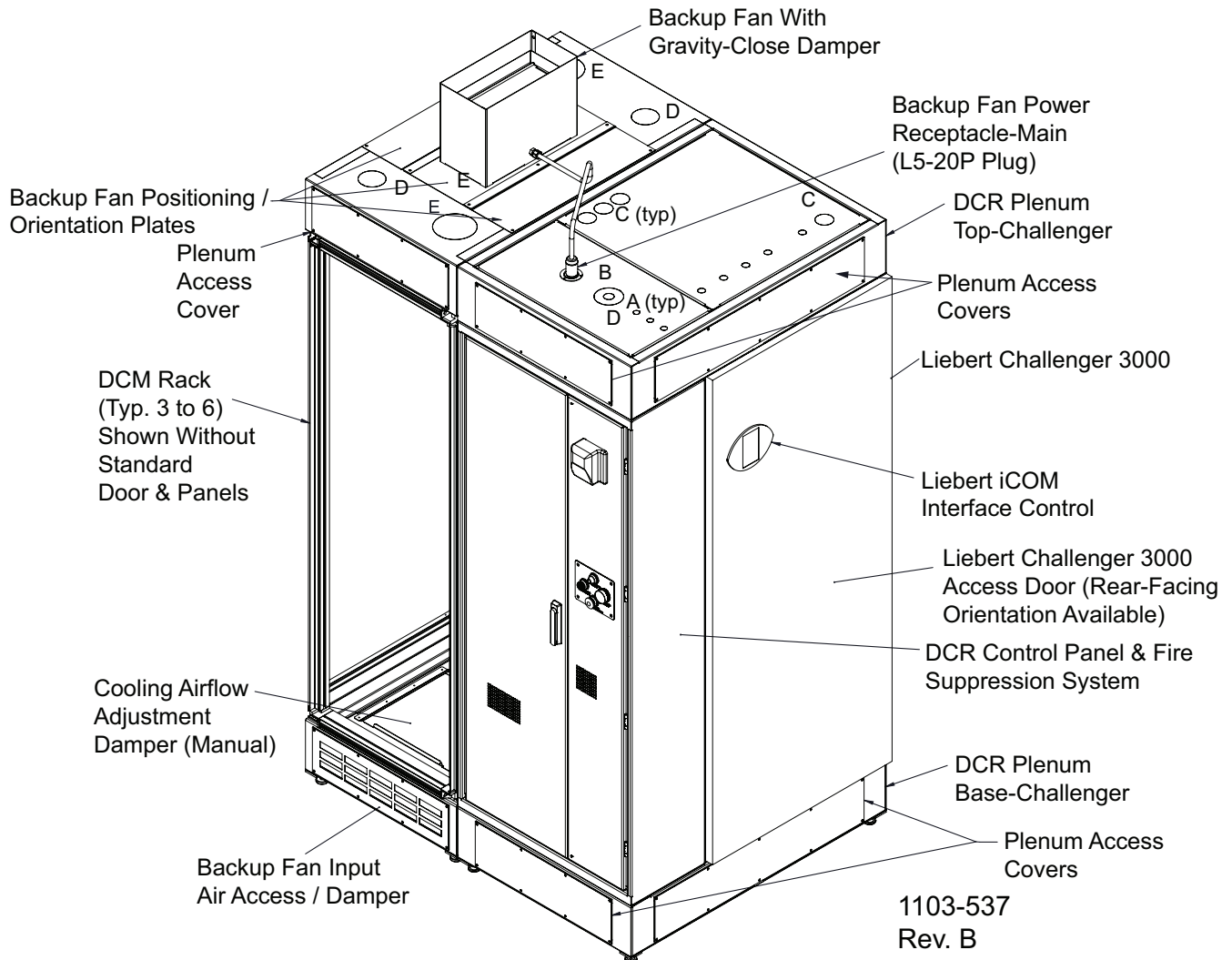
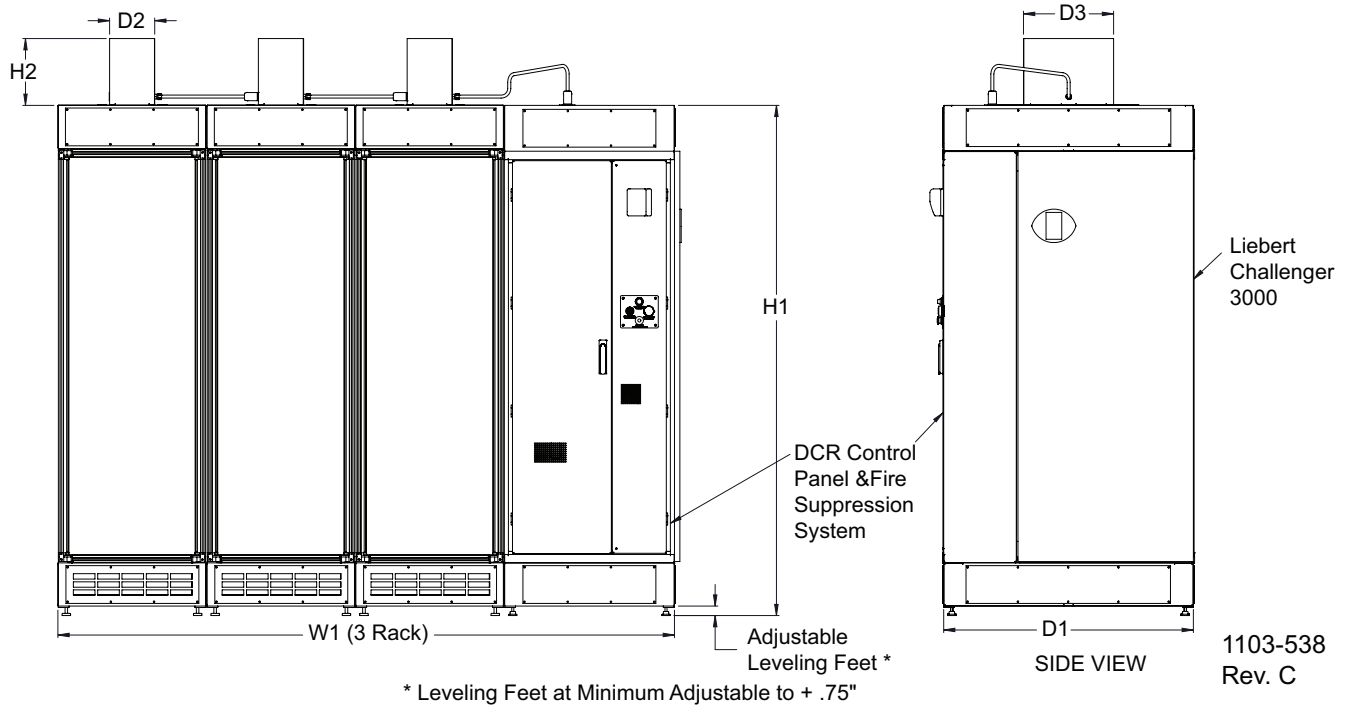


Table 7 Electrical, piping and control knockout sizes*

| Hole | Knockout Diameter | Actual Size | Quantity |
|------|-------------------|-------------|----------|
| A | 1/2" | .94" | 8 |
| B | 1" | 1.48" | 1 |
| C | 2" | 2.63" | 4 |
| D | 3" | 3.81" | 4 |
| E | 5" | 6.06" | 3" |

All entrances must be sealed for proper fire suppression operation.

Figure 31 Liebert DCR dimensions and clearances



* Leveling Feet at Minimum Adjustable to + .75"

Table 8 System Dimensions

| Liebert DCR w/Single Challenger Dimensions | | |
|--|----------------------|------------------|
| Reference | Dimensions, in. (mm) | Weight, lb. (kg) |
| W1 (3 RACK) | 114 (2896) | 2652 (1203) |
| W2 (4 RACK) | 142 (3594) | 3079 (1396) |
| W3 (5 RACK) | 169 (4293) | 3506 (1590) |
| W4 (6 RACK) | 197 (4991) | 3933 (1784) |
| H1 | 94 (2388) | |
| H2 | 12.5 (318) | |
| D1 | 46.3 (1176) | |
| D2 | 8.4 (213) | |
| D3 | 16.7 (424) | |

| Liebert DCR w/Redundant Challenger Dimensions | | |
|---|----------------------|------------------|
| Reference | Dimensions, in. (mm) | Weight, lb. (kg) |
| W1 (3 RACK) | 161.5 (4102) | 3348 (1518) |
| W2 (4 RACK) | 189.2 (4806) | 3775 (1712) |
| W3 (5 RACK) | 216.9 (5509) | 4202 (1906) |
| W4 (6 RACK) | 244.5 (6210) | 4629 (2099) |
| H1 | 94 (2388) | |
| H2 | 12.5 (318) | |
| D1 | 46.3 (1176) | |
| D2 | 8.4 (213) | |
| D3 | 16.7 (424) | |

Table 9 Liebert DCR Part Dimensions and Weights

| Part Number | Description | Component Weight, lb. (kg) | Shipping Weight, lb. (kg) | Component Dimensions DxWxH, in (mm) | Shipping Dimensions DxWxH, in (mm) |
|--------------|--|----------------------------|---------------------------|--------------------------------------|------------------------------------|
| WO232521-101 | DCR Base Plenum-Rack | 87 (39) | 102 (46) | 46.3 x 27.5 x 8.3 (1176 x 699 x 211) | 48 x 33.25 x 11 (1219 x 845 x 279) |
| WO232521-200 | DCR Top Plenum-Rack | 117 (53) | 132 (60) | 46.3 x 27.5 x 8.3 (1176 x 699 x 211) | 48 x 30 x 11 (1219 x 762 x 279) |
| WO232521-300 | DCR Base Plenum-Challenger | 101 (46) | 116 (53) | 46.3 x 27.5 x 8.3 (1176 x 699 x 211) | 48 x 36 x 11 (1219 x 914 x 279) |
| WO232521-400 | DCR Top Plenum-Challenger | 122 (55) | 137 (62) | 46.3 x 31.5 x 9 (1176 x 800 x 229) | 48 x 36 x 11 (1219 x 914 x 279) |
| WO232521-500 | DCR Control Panel and Fire Suppression | 300 (136) | 338 (153) | 76.3 x 31.5 x 14 (1938 x 800 x 356) | 96 x 36 x 20 (2439 x 914 x 508) |
| WO232521-600 | DCR Redundant Control Panel Shell | 141 (64) | 171 (78) | 76.3 x 31.5 x 14 (1938 x 800 x 356) | 96 x 36 x 20 (2439 x 914 x 508) |

Figure 32 Liebert DCR power distribution

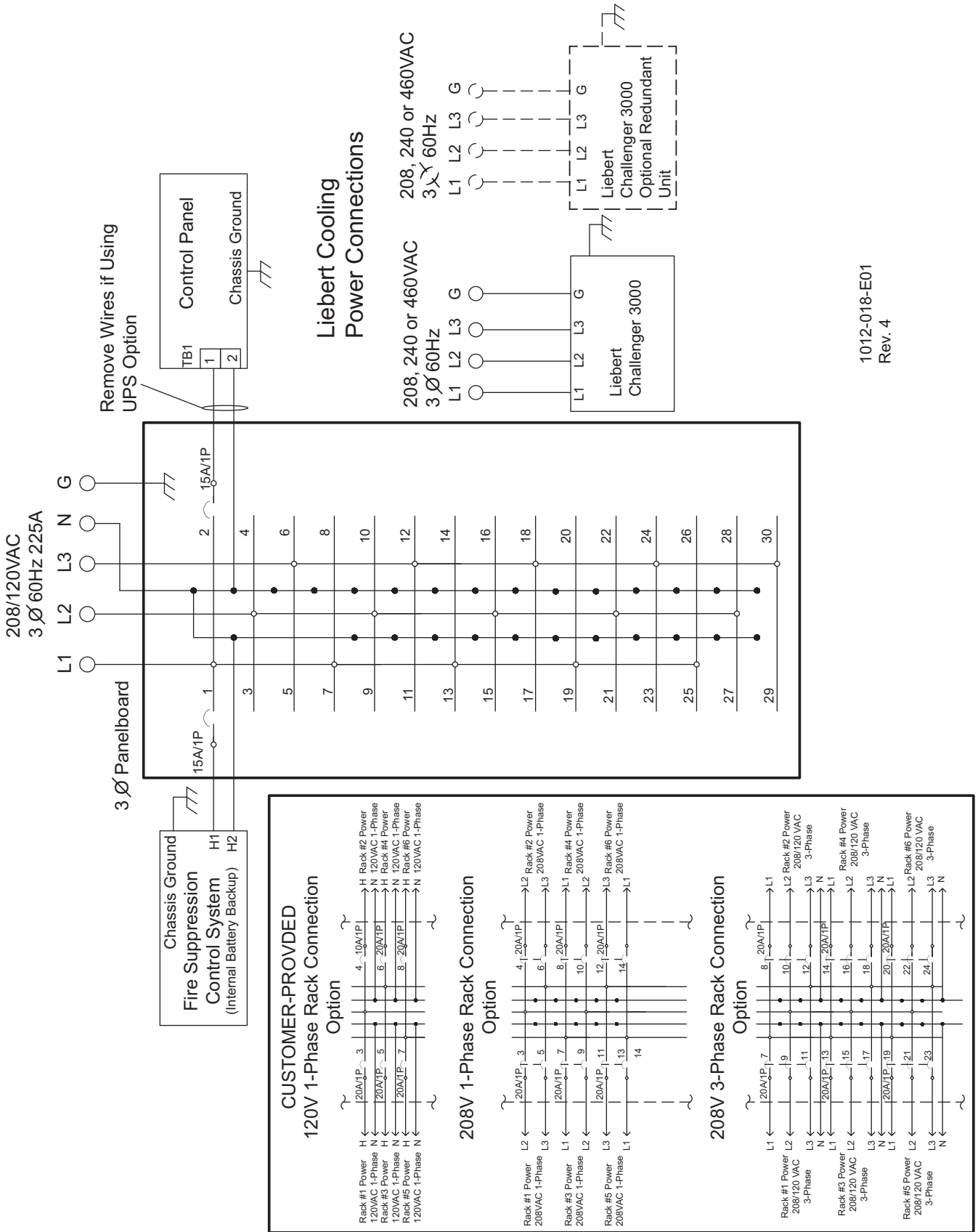
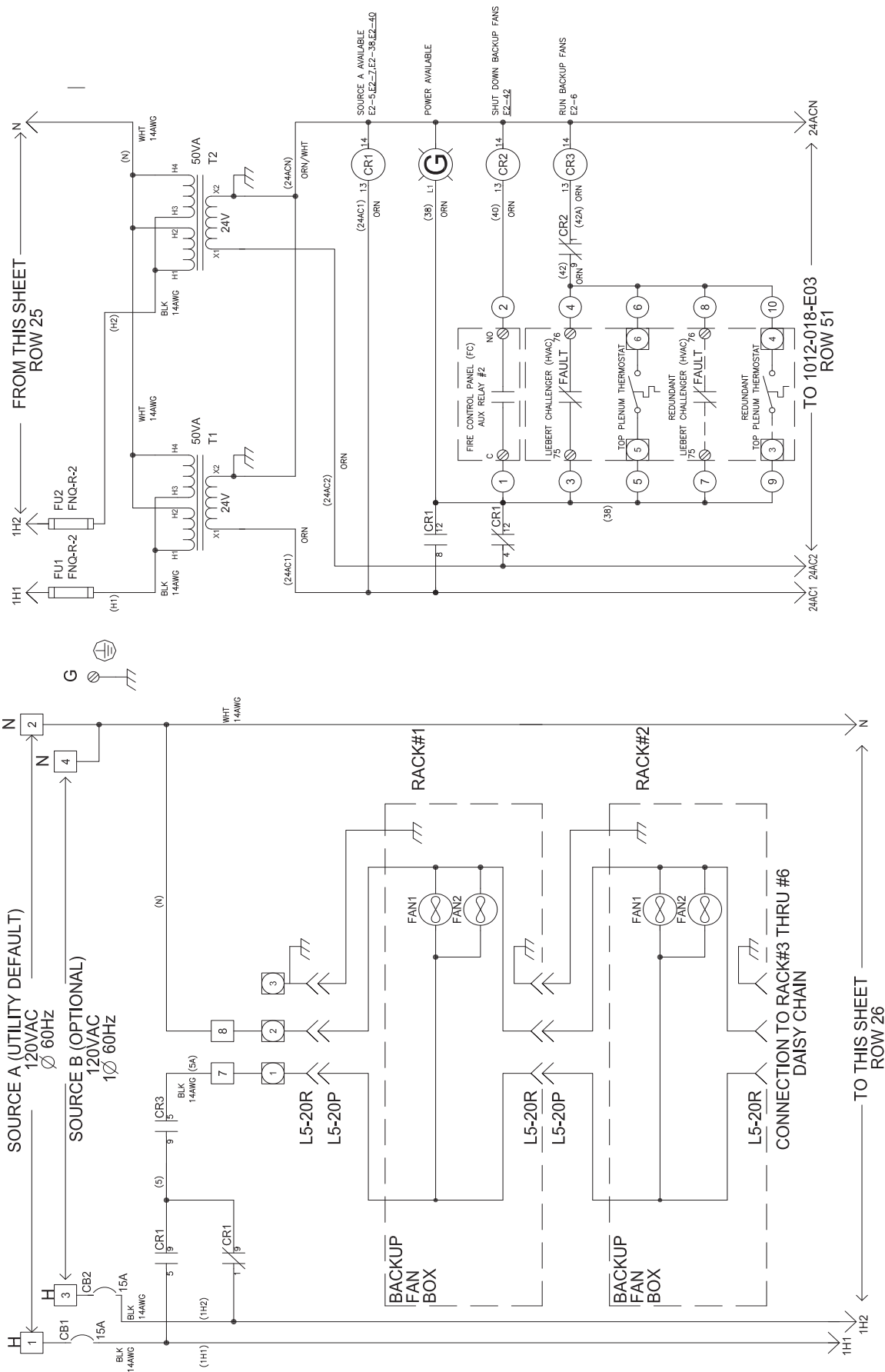


Figure 33 Liebert DCR control logic



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- NOTES:
1. ALL WIRE 14AWG UNLESS NOTED
 2. BLK DENOTES BLACK WIRE
 3. BLU DENOTES BLUE WIRE
 4. BLU/WHIT DENOTES BLUE WIRE WITH WHITE TRACER
 5. ORN DENOTES ORANGE WIRE
 6. ORN/WHIT DENOTES ORANGE WIRE WITH WHITE TRACER
 7. RED DENOTES RED WIRE
 8. T1 TERMINAL BLOCK
 9. T2 TERMINAL BLOCK
 10. T3 TERMINAL BLOCK - TOP PLENUM

Figure 34 Liebert DCR control logic

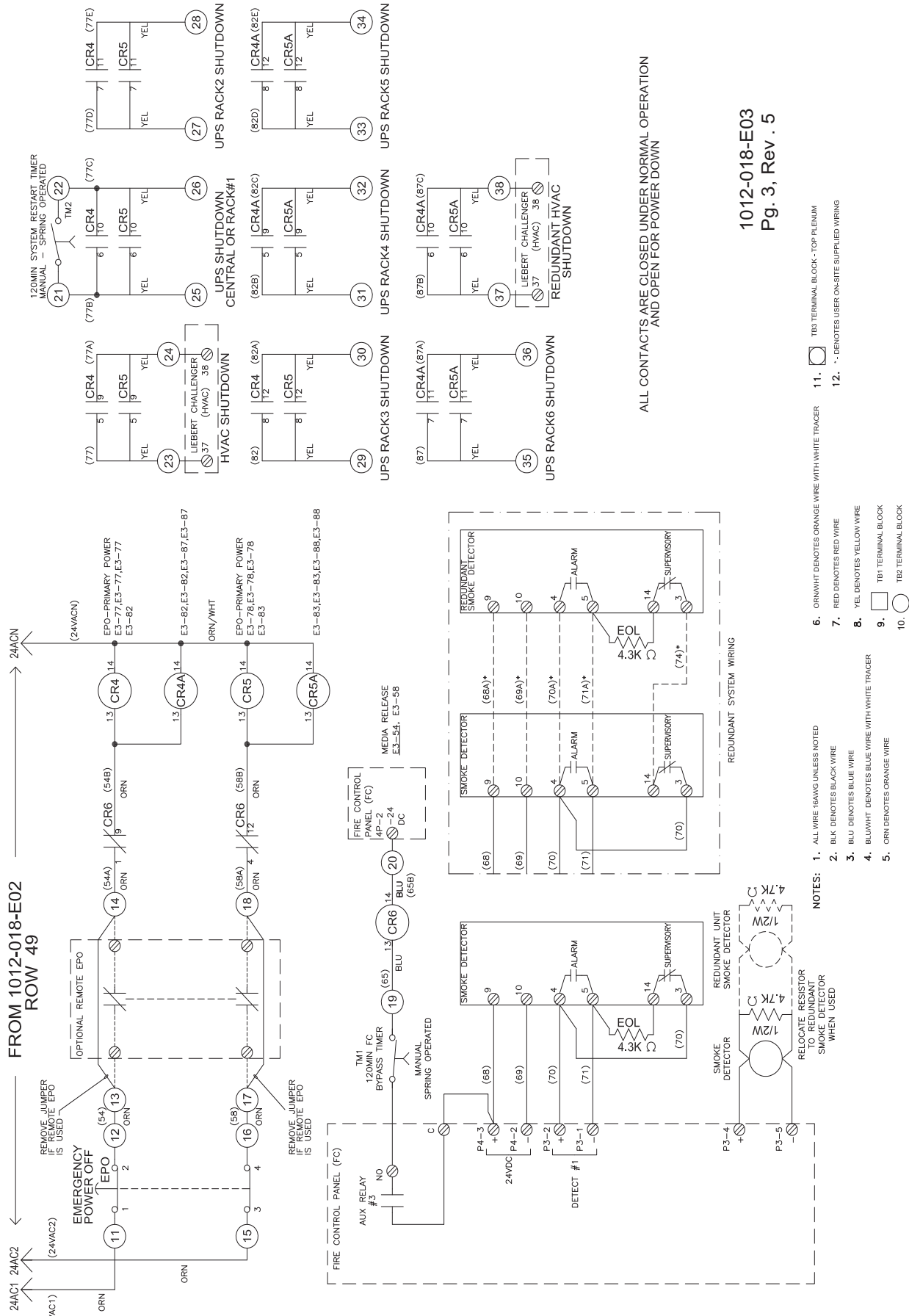
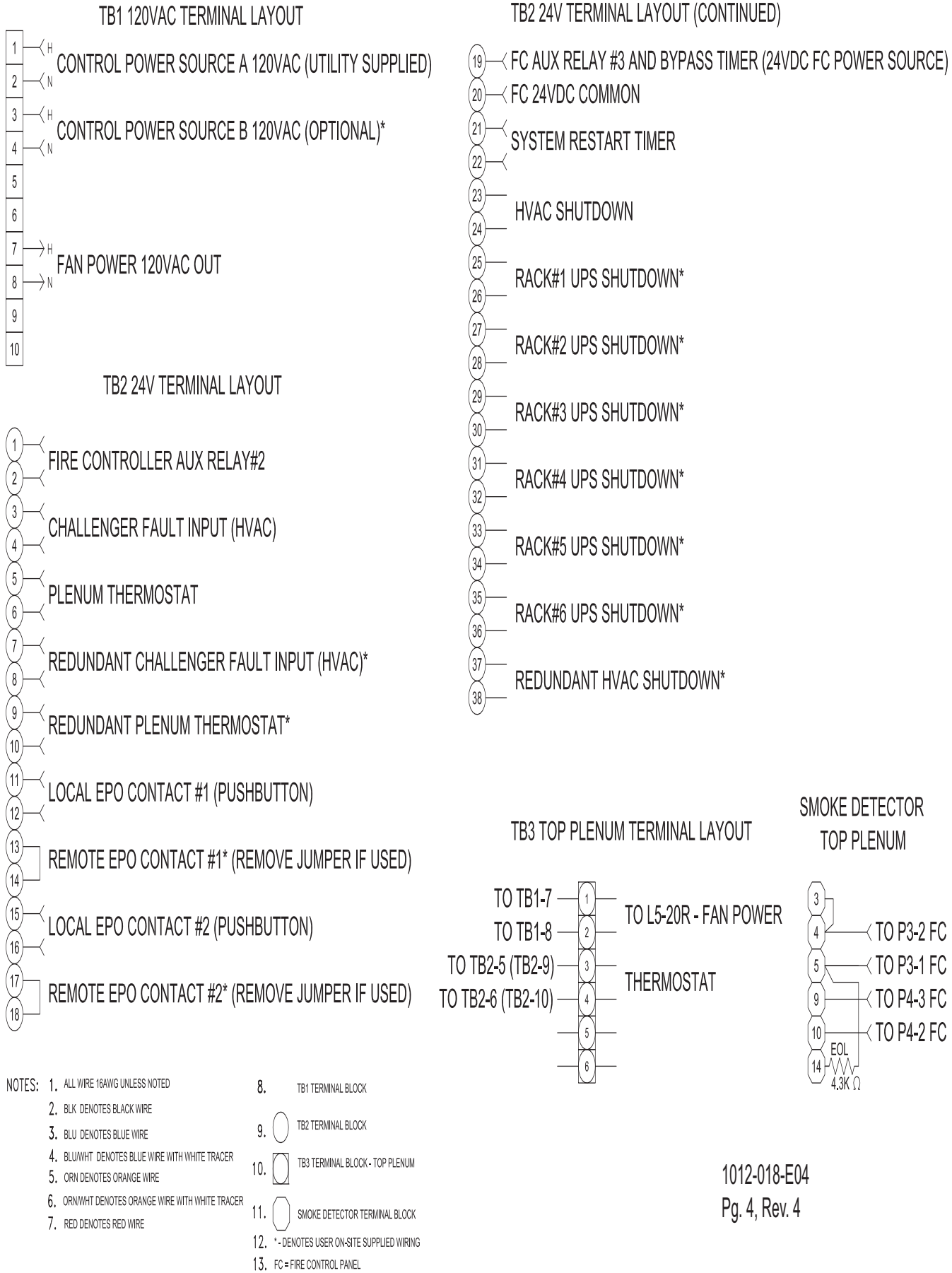


Figure 35 E04



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SL-11464_REV2_03-12

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